

# **GAP**

Release 4.4.10  
2 October 2007

## **Index**

The GAP Group

<http://www.gap-system.org>

# Full Index

This index covers the five main books of the GAP manual, pages are given with respect to each manual: **Ref**, **Tut**, **Prg**, **New**, and **Ext**. A page number in *italics* refers to a whole section which is devoted to the indexed subject. Keywords are sorted with case and spaces ignored, e.g., “**PermutationCharacter**” comes before “permutation group”.

- (Near-)Additive Magma Categories, *R 557*
- (Near-)Additive Magma Generation, *R 558*
- +, *R 48*
- , *R 48*
- A, *R 30*
- B, *R 30*
- C, *R 31*
- D, *R 30*
- K, *R 29*
- L, *R 29*
- M, *R 30*
- N, *R 30*
- O, *R 30*
- P, *R 31*
  - on Macintosh, *R 31*
- R, *R 29*
- T, *R 31*
- U, *R 31*
- W, *R 31*
  - on Macintosh, *R 32*
- X, *R 31*
- Y, *R 31*
- a, *R 30*
  - on Macintosh, *R 32*
- b, *R 27*
- e, *R 27*
  - on Macintosh, *R 32*
- f, *R 27*
  - on Macintosh, *R 32*
- g, *R 28*
- g -g, *R 28*
- h, *R 27*
- i, *R 31*
- l, *R 29*
- m, *R 28*
- n, *R 28*
  - on Macintosh, *R 32*
- o, *R 28*
  - on Macintosh, *R 32*
- p, *R 31*
- q, *R 27*
- r, *R 29*
- x, *R 28*
- y, *R 28*
- z, *R 31*
  - on Macintosh, *R 31*
- ., *E 16*
- .gaprc, *R 33*
- /, *R 48*
  - for character tables, *R 733*
- %, *E 24*
- %display, *E 25*
- %enddisplay, *E 25*
- \*, *R 48*
  - for character tables, *R 733*
- \', *R 251*
- \., *E 16*
- \>, *E 16*
- \Appendices, *E 11*
- \BeginningOfBook, *E 12*
- \Bibliography, *E 11*
- \C, *E 20*
- \Chapter, *E 15*
- \Chapters, *E 11*
- \Colophon, *E 11*
- \Day, *E 14*
- \Declaration, *E 27*
- \EndOfBook, *E 13*
- \F, *E 20*
- \FileHeader, *E 27*
- \FrontMatter, *E 11*
- \Index, *E 13*
- \Mailto, *E 16*
- \Month, *E 14*

`\N`, E 20  
`\OneColumnTableOfContents`, E 11  
`\Package`, E 12  
`\PseudoInput`, E 14  
`\Q`, E 20  
`\R`, E 20  
`\Section`, E 15  
`\TableOfContents`, E 12  
`\TitlePage`, E 11  
`\Today`, E 14  
`\URL`, E 16  
`\UseGapDocReferences`, E 12  
`\UseReferences`, E 11  
`\XYZ`, R 251  
`\Year`, E 14  
`\Z`, E 20  
`\`, R 251  
`\`, R 251  
`\accent127`, E 16  
`\atindex`, E 16  
`\b`, R 251  
`\beginexample`, E 22  
     indicating unstable output, E 23  
`\beginitems`, E 20  
`\beginlist`, E 21  
`\beginntt`, E 22  
`\c`, R 251  
`\calR`, E 20  
`\endexample`, E 22  
`\enditems`, E 20  
`\endlist`, E 21  
`\endt`, E 22  
`\fmark`, E 16  
`\in`, operation for testing membership, R 276  
`\index`, E 16  
`\indextt`, E 16  
`\item`, E 21  
`\itemitem`, E 21  
`\kernttindent`, E 16  
`\lq`, E 16  
`\matrix`, E 23  
`\n`, R 251  
`\nolabel`, use in index and label suppression, E 15  
`\null`, use in index suppression, E 15  
`\package`, E 11  
`\pif`, E 16  
`\r`, R 251  
`\rq`, E 16

$\sim$ , R 48  
     for class functions, R 772  
 1-Cohomology, R 379  
 2-Cohomology and Extensions, R 458

## A

A, Attribute mark-up, E 16  
 AbelianGroup, R 511  
 AbelianInvariants, for character tables, R 735  
     for groups, R 368  
 Abelian Invariants for Subgroups, R 478  
 AbelianInvariantsMultiplier, R 382  
 AbelianInvariantsNormalClosureFpGroup, R 478  
 AbelianInvariantsNormalClosureFpGroupRrs,  
     R 478  
 AbelianInvariantsOfList, R 243  
 AbelianInvariantsSubgroupFpGroup, R 478  
 AbelianInvariantsSubgroupFpGroupMtc, R 478  
 AbelianInvariantsSubgroupFpGroupRrs, R 478  
 AbelianNumberField, R 591  
 abelian number field, R 593  
 abelian number fields, canonicalbasis, R 594  
 abelian number fields, Galois group, R 596  
 AbelianSubfactorAction, R 404  
 About Functions, T 25  
 About Group Actions, R 396  
 AbsInt, R 127  
 AbsoluteIrreducibleModules, R 753  
 AbsoluteValue, R 159  
 absolute value of an integer, R 127  
 AbsolutIrreducibleModules, R 753  
 abstract word, R 325  
 AbstractWordTietzeWord, R 487  
 accessing, list elements, R 174  
     record elements, R 262  
 Accessing a Module, R 697  
 Accessing Record Elements, R 262  
 Accessing Subgroups via Tables of Marks, R 718  
 Accessing Weak Pointer Objects as Lists, E 53  
 Acknowledgements, T 12  
 AClosestVectorCombinationsMatFFFEVecFFE,  
     R 219  
 AClosestVectorCombinationsMatFFFEVec-  
     FFFECoords, R 219  
 ActingAlgebra, R 634  
 ActingDomain, R 408  
 Acting OnRight and OnLeft, R 434  
 Action, R 403

- action, by conjugation, R 397
  - on blocks, R 397
  - on sets, R 397
- ActionHomomorphism, R 402
- Action of a group on itself, R 404
- Action on Subfactors Defined by a Pcgs, R 449
- actions, R 397
- Actions of Groups, T 47
- Actions of Matrix Groups, R 430
- ActorOfExternalSet, R 410
- Add, R 177
- add, an element to a set, R 197
- AddCoeffs, R 217
- AddGenerator, R 489
- AddGenerators, R 345
- AddGeneratorsExtendSchreierTree, R 426
- AddHashEntry, N 10
- Adding a new Attribute, P 38
- Adding a new Operation, P 37
- Adding a new Representation, P 39
- Adding new Concepts, P 40
- addition, R 48
  - list and non-list, R 186
  - matrices, R 223
  - matrix and scalar, R 223
  - operation, R 296
  - rational functions, R 670
  - scalar and matrix, R 223
  - scalar and matrix list, R 225
  - scalar and vector, R 215
  - vector and scalar, R 215
  - vectors, R 215
- Addition of a Method, P 35
- Additive Arithmetic for Lists, R 186
- AdditiveInverse, R 294
- AdditiveInverseAttr, R 294
- AdditiveInverseImmutable, R 294
- AdditiveInverseMutable, R 294
- AdditiveInverseOp, R 294
- AdditiveInverseSameMutability, R 294
- AdditiveInverseSM, R 294
- AdditiveNeutralElement, R 559
- AddRelator, R 489
- AddRowVector, R 217
- AddRule, R 345
- AddRuleReduced, R 345
- AddSet, R 197
- AdjointAssociativeAlgebra, R 651
- AdjointBasis, R 623
- AdjointMatrix, R 651
- AdjointModule, R 636
- Advanced Features of GAP, R 30
- Advanced List Manipulations, R 205
- Advanced Methods for Dixon-Schneider
  - Calculations, R 754
- AffineAction, R 449
- AffineActionLayer, R 449
- AffineOperation, R 449
- AffineOperationLayer, R 449
- A First Attempt to Implement Elements of Residue
  - Class Rings, P 45
- Agemo, R 365
- AgGroup, T 79
- Algebra, R 614
- AlgebraByStructureConstants, R 617
- AlgebraGeneralMappingByImages, R 628
- AlgebraHomomorphismByImages, R 628
- AlgebraHomomorphismByImagesNC, R 628
- AlgebraicExtension, R 691
- Algebraic Structure, T 69
- Algebras, T 61
- AlgebraWithOne, R 614
- AlgebraWithOneGeneralMappingByImages, R 629
- AlgebraWithOneHomomorphismByImages, R 629
- AlgebraWithOneHomomorphismByImagesNC, R 629
- AllBlocks, R 407
- AllIrreducibleSolvableGroups, R 529
- AllLibraryGroups, R 517
- AllPrimitiveGroups, R 517
- AllSmallGroups, R 520
- AllTransitiveGroups, R 517
- Alpha, R 824
- AlternatingGroup, R 511
- and, R 170
  - for filters, R 171
- An Example of Advanced Dixon-Schneider
  - Calculations, R 755
- An Example of a GAP Package, E 36
- ANFAutomorphism, R 596
- AntiSymmetricParts, R 789
- antisymmetric relation, R 315
- Append, R 178
- AppendTo, R 95
  - for streams, R 101
- Apple, R 841
- ApplicableMethod, R 78, T 75

- ApplicableMethod, *R* 78
- Applicable Methods and Method Selection, *P* 12
- ApplicableMethodTypes, *R* 78
- Apply, *R* 200
- ApplyFunc, *T* 79
- ApplySimpleReflection, *R* 648
- ApproximateSuborbitsStabilizerPermGroup, *R* 424
- ARCH\_IS\_MAC, *R* 35
- ARCH\_IS\_UNIX, *R* 35
- ARCH\_IS\_WINDOWS, *R* 35
- arg, special function argument, *R* 46
- ArithmeticElementCreator, *P* 43
- Arithmetic for External Representations of Polynomials, *R* 690
- Arithmetic for Lists, *R* 184
- Arithmetic Issues in the Implementation of New Kinds of Lists, *P* 27
- Arithmetic Operations for Class Functions, *R* 771
- Arithmetic Operations for Elements, *R* 296
- Arithmetic Operations for General Mappings, *R* 309
- Arithmetic Operators, *R* 48
- Arrangements, *R* 149
- arrow notation for functions, *R* 57
- AsAlgebra, *R* 623
- AsAlgebraWithOne, *R* 624
- AsBinaryRelationOnPoints, *R* 316
- AsBlockMatrix, *R* 239
- AscendingChain, *R* 371
- AsDivisionRing, *R* 578
- AsDuplicateFreeList, *R* 199
- A Second Attempt to Implement Elements of Residue Class Rings, *P* 47
- AsField, *R* 578
- AsFreeLeftModule, *R* 575
- AsGroup, *R* 350
- AsGroupGeneralMappingByImages, *R* 386
- AsLeftIdeal, *R* 565
- AsLeftModule, *R* 573
- AsList, *R* 271
- AsMagma, *R* 320
- AsMonoid, *R* 545
- AsPolynomial, *R* 672
- AsRightIdeal, *R* 565
- AsRing, *R* 562
- AsSemigroup, *R* 538
- Assert, *R* 81
- AssertionLevel, *R* 81
- Assertions, *R* 81
- AsSet, *R* 271
- AssignGeneratorVariables, *R* 332
- assignment, *T* 22
  - to a list, *R* 176
  - to a record, *R* 262
  - variable, *R* 50
- Assignments, *R* 50
- AssignNiceMonomorphismAutomorphismGroup, *R* 392
- AssociatedPartition, *R* 154
- AssociatedReesMatrixSemigroupOfDClass, *R* 544
- Associates, *R* 568
- associativity, *R* 48
- AssocWordByLetterRep, *R* 337
- AsSomething, *T* 70
- AsSortedList, *R* 271
- AsSSortedList, *R* 271
- AsStruct, *R* 288
- AsSubalgebra, *R* 624
- AsSubalgebraWithOne, *R* 624
- AsSubgroup, *R* 351
- AsSubgroupOfWholeGroupByQuotient, *R* 476
- AsSubmagma, *R* 321
- AsSubmonoid, *R* 545
- AsSubsemigroup, *R* 538
- AsSubspace, *R* 599
- AsSubstruct, *R* 291
- AsTransformation, *R* 555
- AsTransformationNC, *R* 555
- AsTwoSidedIdeal, *R* 565
- AsVectorSpace, *R* 598
- at exit functions, *R* 73
- ATLAS Irrationalities, *R* 161
- AtlasIrrationality, *R* 163
- atomic irrationalities, *R* 161
- Attributes, *R* 121, *T* 72
- Attributes and Operations for Algebras, *R* 622
- Attributes and Properties for (Near-)Additive Magmas, *R* 559
- Attributes and Properties for Collections, *R* 272
- Attributes and Properties for Magmas, *R* 322
- Attributes and Properties for Matrix Groups, *R* 429
- Attributes and Properties of Character Tables, *R* 733
- Attributes and Properties of Elements, *R* 292
- Attributes of and Operations on Equivalence Relations, *R* 317

Attributes of Tables of Marks, *R 708*  
 Attributes vs. Record Components, *T 81*  
 AttributeValueNotSet, *R 122*  
 AugmentationIdeal, *R 663*  
 AugmentedCosetTableInWholeGroup, *R 470*  
 AugmentedCosetTableMtc, *R 470*  
 AugmentedCosetTableRrs, *R 470*  
 Augmented Coset Tables and Rewriting, *R 470*  
 Authorship and Maintenance, *T 12*  
 automatic loading of gap packages, *R 845*  
 AutomorphismDomain, *R 391*  
 AutomorphismGroup, *R 391*  
     for groups with pcgs, *R 450*  
 automorphism group, of number fields, *R 596*  
 Automorphisms and Equivalence of Character  
     Tables, *R 763*  
 AutomorphismsOfTable, *R 737*

## B

$b_N$ , *R 161*  
 backslash character, *R 251*  
 backspace character, *R 251*  
 Backtrace, *T 86*  
     GAP3 name for Where, *R 70*  
 Backtrack, *R 426*  
 BANNER, *R 850*  
 BaseFixedSpace, *R 230*  
 BaseIntersectionIntMats, *R 240*  
 BaseIntMat, *R 240*  
 BaseMat, *R 233*  
 BaseMatDestructive, *R 233*  
 BaseOfGroup, *N 20*, *R 423*  
 BaseOrthogonalSpaceMat, *R 233*  
 BasePointOfSchreierTransversal, *N 17*  
 Bases of Vector Spaces, *R 600*  
 BaseStabChain, *R 423*  
 BaseSteinitzVectors, *R 233*  
 Basic Actions, *R 397*  
 Basic Groups, *R 510*  
 Basic Operations for Class Functions, *R 769*  
 Basic Operations for Lists, *R 174*  
 BasicWreathProductOrdering, *R 284*  
 Basis, *R 601*  
 BasisNC, *R 601*  
 BasisVectors, *R 602*  
 Bell, *R 148*  
 Bernoulli, *R 148*  
 BestQuoInt, *R 129*

BestSplittingMatrix, *R 754*  
 BiAlgebraModule, *R 632*  
 BiAlgebraModuleByGenerators, *R 632*  
 bibtex, *E 26*  
 BilinearFormMat, *R 647*  
 binary relation, *R 314*  
 BinaryRelationByElements, *R 314*  
 BinaryRelationOnPoints, *R 316*  
 BinaryRelationOnPointsNC, *R 316*  
 Binary Relations on Points, *R 316*  
 BinaryRelationTransformation, *R 556*  
 BindGlobal, *P 31*, *R 45*  
 Binomial, *R 147*  
 blank, *R 41*  
 BlistList, *R 210*  
 Block Matrices, *R 239*  
 BlockMatrix, *R 239*  
 Blocks, *R 407*  
 BlocksInfo, *R 742*  
 Block Systems, *R 407*  
 BlownUpMat, *R 235*  
 BlownUpVector, *R 235*  
 BlowUpIsomorphism, *R 430*  
 BNF, *R 59*  
 body, *R 55*  
 BombieriNorm, *R 678*  
 Boolean Lists Representing Subsets, *R 210*  
 bound, *R 43*  
 Brauer character, *R 776*  
 BrauerCharacterValue, *R 799*  
 BrauerTable, *R 727*  
 BrauerTableOp, *R 727*  
 BravaisGroup, *R 433*  
 BravaisSubgroups, *R 433*  
 BravaisSupergroups, *R 433*  
 Break, *R 55*  
 break loop message, *R 70*  
 Break Loops, *R 67*  
 break loops, *T 20*  
 break statement, *R 55*  
 browsing backwards, *R 22*  
 browsing backwards one chapter, *R 23*  
 browsing forward, *R 22*  
 browsing forward one chapter, *R 23*  
 browsing the next section browsed, *R 23*  
 browsing the previous section browsed, *R 23*  
 Browsing through the Sections, *R 22*  
 bug reports, see If Things Go Wrong, *R 837*

Building new orderings, *R* 280  
 buildman.pe, *E* 27

## C

C, Category mark-up, *E* 16  
 $c_N$ , *R* 161  
 Calculating with Group Automorphisms, *R* 392  
 Calendar Arithmetic, *R* 258  
 CallFuncList, *R* 62  
 Calling a function with a list argument that is interpreted as several arguments, *R* 62  
 Calling of and Communication with External Binaries, *E* 39  
 Cancellation Tests for Rational Functions, *R* 690  
 CanComputeIndex, *R* 383  
 CanComputeIsSubset, *R* 383  
 CanComputeSize, *R* 383  
 CanComputeSizeAnySubgroup, *R* 383  
 candidates, for permutation characters, *R* 792  
 CanEasilyCompareElements, *R* 295  
 CanEasilyCompareElementsFamily, *R* 295  
 CanEasilyComputePcgs, *R* 436  
 CanEasilySortElements, *R* 295  
 CanEasilySortElementsFamily, *R* 295  
 CanEasilyTestMembership, *R* 383  
 CanonicalBasis, *R* 601  
 canonical basis, for matrix spaces, *R* 608  
   for row spaces, *R* 608  
 CanonicalElt, *N* 14  
 CanonicalGenerators, *R* 647  
 CanonicalPcElement, *R* 438  
 CanonicalPcgs, *R* 441  
 CanonicalPcgsByGeneratorsWithImages, *R* 443  
 CanonicalRepresentativeDeterminatorOf-  
   ExternalSet, *R* 410  
 CanonicalRepresentativeOfExternalSet, *R* 410  
 CanonicalRightCosetElement, *R* 357  
 Carmichael's lambda function, *R* 139  
 carriage return character, *R* 251  
 CartanMatrix, *R* 646  
 CartanSubalgebra, *R* 643  
 Cartesian, *R* 201  
 Categories, *R* 118  
 Categories and Properties of Algebras, *R* 621  
 Categories for Streams and the StreamsFamily, *R* 97  
 Categories of Associative Words, *R* 330  
 Categories of Matrices, *R* 222  
 CategoriesOfObject, *R* 120

Categories of Words and Nonassociative Words,  
   *R* 325  
 CategoryCollections, *P* 16, *R* 268  
 CategoryFamily, *P* 16  
 Catering for Plain Text and HTML Formats, *E* 25  
 Center, *R* 323  
 center, *R* 322  
 CentralCharacter, *R* 780  
 central character, *R* 780  
 CentralIdempotentsOfAlgebra, *R* 626  
 centraliser, *R* 322  
 Centralizer, *R* 322  
   for groups with pcgs, *R* 450  
 CentralizerInGLnZ, *R* 433  
 CentralizerModulo, *R* 372  
 CentralizerSizeLimitConsiderFunction, *R* 451  
 CentralNormalSeriesByPcgs, *R* 445  
 Centre, *R* 323  
   for groups with pcgs, *R* 450  
 centre, of a character, *R* 779  
 CentreOfCharacter, *R* 779  
 CF, *R* 591  
 ChainHomomorphicImage, *N* 20  
 ChainStatistics, *N* 20  
 ChainSubgroup, *N* 19  
 ChainSubgroupByDirectProduct, *N* 21  
 ChainSubgroupByHomomorphism, *N* 21  
 ChainSubgroupByProjectionFunction, *N* 21  
 ChainSubgroupByPSubgroupOfAbelian, *N* 21  
 ChainSubgroupBySiftFunction, *N* 21  
 ChainSubgroupByStabiliser, *N* 20  
 ChainSubgroupByTrivialSubgroup, *N* 21  
 ChainSubgroupQuotient, *N* 21  
 ChangedBaseGroup, *N* 20  
 Changed Command Line Options, *T* 77  
 Changed Functionality, *T* 78  
 Changed Variable Names, *T* 79  
 Changes from Earlier Versions, *T* 13  
 ChangeStabChain, *R* 425  
 Changing Presentations, *R* 489  
 Changing the Help Viewer, *R* 23  
 Changing the Representation, *R* 289  
 Changing the Structure, *R* 288, *T* 70  
 Chapters and Sections, *E* 15  
 CHAR.INT, *R* 257  
 CHAR.SINT, *R* 257  
 Character, *R* 774  
 Character Conversion, *R* 257

- CharacterDegrees, R 733
- Character Degrees and Derived Length, *R 824*
- Characteristic, R 292
- characteristic, for class functions, R 773
- CharacteristicPolynomial, R 234
- characteristic polynomial, for field elements, R 580
- CharacterNames, R 737
- CharacterParameters, R 738
- characters, R 767
  - permutation, R 792
  - symmetrizations of, R 788
- CharacterTable, R 727
- Character Table Categories, *R 729*
- CharacterTableDirectProduct, R 757
- CharacterTableFactorGroup, R 758
- CharacterTableIsoclinic, R 759
- CharacterTableRegular, R 728
- character tables, R 726
  - access to, R 726
  - calculate, R 726
  - infix operators, R 733
  - of groups, R 726
- CharacterTableWithSortedCharacters, R 760
- CharacterTableWithSortedClasses, R 761
- CharacterTableWreathSymmetric, R 759
- character value, of group element using powering operator, R 772
- CharsFamily, R 253
- CharTable, T 79
- CheapFactorsInt, R 134
- CheckFixedPoints, R 813
- CheckForHandlingByNiceBasis, R 613
- CheckPermChar, R 820
- ChevalleyBasis, R 645
- ChiefNormalSeriesByPcgs, R 446
- ChiefSeries, R 369
- ChiefSeriesThrough, R 369
- ChiefSeriesUnderAction, R 369
- ChineseRem, R 130
- Chinese remainder, R 131
- Chomp, R 256
- CIUnivPols, R 670
- ClassElementLattice, R 374
- classes, real, R 739
- ClassesSolvableGroup, R 450
- ClassFunction, R 774
- class function, R 767
- class function objects, R 767
- class functions, R 810
  - as ring elements, R 771
- ClassFunctionSameType, R 775
- Class Fusions between Character Tables, *R 805*
- Classical Groups, *R 512*
- ClassMultiplicationCoefficient, for character tables, R 746
- class multiplication coefficient, R 746
- ClassNames, R 737
- ClassNamesTom, R 709
- ClassOrbit, R 739
- ClassParameters, R 738
- ClassPermutation, R 761
- ClassPositionsOfAgemo, R 739
- ClassPositionsOfCentre, for characters, R 779
  - for character tables, R 739
- ClassPositionsOfDerivedSubgroup, R 740
- ClassPositionsOfDirectProduct-  
Decompositions, R 740
- ClassPositionsOfElementaryAbelianSeries,  
R 740
- ClassPositionsOfFittingSubgroup, R 740
- ClassPositionsOfKernel, R 778
- ClassPositionsOfLowerCentralSeries, R 740
- ClassPositionsOfMaximalNormalSubgroups,  
R 739
- ClassPositionsOfMinimalNormalSubgroups,  
R 739
- ClassPositionsOfNormalClosure, R 740
- ClassPositionsOfNormalSubgroup, R 765
- ClassPositionsOfNormalSubgroups, R 739
- ClassPositionsOfSupersolvableResiduum, R 740
- ClassPositionsOfUpperCentralSeries, R 740
- ClassRoots, R 739
- ClassStructureCharTable, R 746
- ClassTypesTom, R 708
- CleanedTailPcElement, R 439
- ClearCacheStats, R 84
- ClearProfile, R 83
- clone, an object, R 113
- CloseMutableBasis, R 606
- CloseStream, R 98
- ClosureGroup, R 353
- ClosureGroupAddElm, R 353
- ClosureGroupCompare, R 353
- ClosureGroupDefault, R 353
- ClosureGroupIntest, R 353
- ClosureLeftModule, R 574



- ClosureNearAdditiveGroup, R 560
- Closure Operations and Other Constructors, *R 316*
- ClosureRing, R 562
- Closures of (Sub)groups, *R 353*
- ClosureSomething, T 70
- ClosureStruct, R 288
- ClosureSubgroup, R 353
- ClosureSubgroupNC, R 353
- Coboundaries, R 656
- Cochain, R 655
- CochainSpace, R 655
- Cocycles, R 656
- cocycles, R 379
- CodePcGroup, R 461
- CodePcgs, R 461
- Coding a Pc Presentation, *R 461*
- coefficient, binomial, R 147
- Coefficient List Arithmetic, *R 217*
- Coefficients, R 602
- coefficients, for cyclotomics, R 159
- CoefficientsAndMagmaElements, R 664
- CoefficientsFamily, R 687
- CoefficientsMultiadic, R 130
- CoefficientsOfLaurentPolynomial, R 679
- CoefficientsOfUnivariatePolynomial, R 672
- CoefficientsOfUnivariateRationalFunction, R 672
- CoefficientsQadic, R 130
- CoefficientsRing, R 680
- CoeffsCyc, R 159
- CoeffsMod, R 218
- cohomology, R 379
- COHORTS\_PRIMITIVE\_GROUPS, R 527
- cokernel, T 55
- CoKernelOfAdditiveGeneralMapping, R 311
- CoKernelOfMultiplicativeGeneralMapping, R 310
- CollapsedMat, R 816
- Collected, R 199
- Collection Families, *R 267*
- CollectionsFamily, P 20, R 267
- Coloring the Prompt and Input, *R 38*
- ColorPrompt, R 38
- ColumnIndexOfReesMatrixSemigroupElement, R 544
- ColumnIndexOfReesZeroMatrixSemigroupElement, R 544
- Combinations, R 149
- Combinations, Arrangements and Tuples, *R 149*
- CombinatorialCollector, R 455
- Combinatorial Numbers, *R 147*
- Comm, R 296
  - for words, R 334
- Command Line Options, *R 27*
- command mark-up, E 16
- comments, R 41, T 19
- CommutativeDiagram, R 813
- CommutatorFactorGroup, R 372
- CommutatorLength, R 363
  - for character tables, R 735
- CommutatorSubgroup, R 362
- Compacted, R 198
- CompanionMat, R 236
- CompareVersionNumbers, R 848
- comparison, fp semigroup elements, R 550
  - operation, R 295
  - rational functions, R 670
- Comparison of Associative Words, *R 333*
- Comparison of Class Functions, *R 770*
- Comparison of Elements of Finitely Presented Groups, *R 464*
- Comparison of Elements of Finitely Presented Semigroups, *R 550*
- Comparison of Permutations, *R 412*
- Comparison of Rational Functions, *R 670*
- Comparison of Words, *R 327*
- Comparison Operations for Elements, *R 295*
- Comparisons, *R 47*
- comparisons, of booleans, R 169
  - of lists, R 183
- Comparisons of Booleans, *R 169*
- Comparisons of Cyclotomics, *R 161*
- Comparisons of Lists, *R 183*
- Comparisons of Records, *R 264*
- Comparisons of Strings, *R 253*
- Compatibility Mode, *T 87*
- Compatibility of Residue Class Rings with Prime Fields, *P 57*
- CompatibleConjugacyClasses, R 732
- CompatiblePairs, R 459
- Compilation, *R 832*
- Compiling Library Code, *R 36*
- Complementclasses, R 362
- ComplementclassesEA, R 381
- ComplementIntMat, R 241
- ComplementSystem, R 365

- CompleteSchreierTransversal, N 17
- Completion Files, *R 34*
- ComplexConjugate, R 164
  - for class functions, R 773
- ComplexificationQuat, R 618
- Component Objects, *P 21*
- Components of a Dixon Record, *R 755*
- Components versus Attributes, *P 40*
- CompositionMapping, R 304
  - for Frobenius automorphisms, R 588
- CompositionMapping2, R 304
- CompositionMaps, R 810
- CompositionOfStraightLinePrograms, R 341
- CompositionSeries, R 369
  - for groups with pcgs, R 450
- ComputedBrauerTables, R 727
- ComputedClassFusions, R 806
- ComputedIndicators, R 745
- ComputedIsPSolvableCharacterTables, R 745
- ComputedPowerMaps, R 802
- ComputedPrimeBlockss, R 741
- Computing a Pcg, *R 436*
- Computing a Permutation Representation, *R 416*
- Computing Pc Groups, *R 456*
- Computing Possible Permutation Characters, *R 795*
- Computing the Irreducible Characters of a Group, *R 750*
- Concatenation, R 198
- concatenation, of lists, R 198
- Conductor, R 159
- ConfluentRws, R 345
- Congruences, for character tables, R 818
- Congruences for semigroups, *R 541*
- ConjugacyClass, R 359
- Conjugacy Classes, *R 359*
- ConjugacyClasses, attribute, R 359
  - for character tables, R 731
  - for groups with pcgs, R 450
  - for linear groups, R 516
- ConjugacyClassesByOrbits, R 360
- ConjugacyClassesByRandomSearch, R 360
- Conjugacy Classes in Classical Groups, *R 516*
- Conjugacy Classes in Solvable Groups, *R 450*
- ConjugacyClassesMaximalSubgroups, R 373
- ConjugacyClassesPerfectSubgroups, R 376
- ConjugacyClassesSubgroups, R 373
- ConjugacyClassSubgroups, R 373
- conjugate, matrix, R 224
  - of a word, R 334
- ConjugateDominantWeight, R 648
- ConjugateDominantWeightWithWord, R 648
- ConjugateGroup, R 350
- Conjugates, R 581
- ConjugateSubgroup, R 352
- ConjugateSubgroups, R 352
- conjugation, R 397
- ConjugatorAutomorphism, R 390
- ConjugatorAutomorphismNC, R 390
- ConjugatorIsomorphism, R 389
- ConjugatorOfConjugatorIsomorphism, R 390
- ConnectGroupAndCharacterTable, R 731
- ConsiderKernels, R 818
- ConsiderSmallerPowerMaps, R 819
- ConsiderStructureConstants, R 810
- ConsiderTableAutomorphisms, R 821
- constants, T 21
- ConstantTimeAccessList, R 194
- constituent, of a group character, R 777
- ConstituentsCompositionMapping, R 305
- ConstituentsOfCharacter, R 778
- Constructing Algebras as Free Algebras, *R 615*
- Constructing Algebras by Generators, *R 614*
- Constructing Algebras by Structure Constants, *R 616*
- Constructing Character Tables from Others, *R 757*
- Constructing Domains, *R 287*
- Constructing Lie algebras, *R 640*
- Constructing Pc Groups, *R 454*
- Constructing Subdomains, *R 291*
- Constructing Tables of Marks, *R 703*
- Constructing Vector Spaces, *R 598*
- Construction of Abelian Number Fields, *R 591*
- Construction of Stabilizer Chains, *R 421*
- Constructors for Basic Groups, *R 516*
- ContainedCharacters, R 817
- ContainedDecomposables, R 817
- ContainedMaps, R 812
- ContainedPossibleCharacters, R 815
- ContainedPossibleVirtualCharacters, R 815
- ContainedSpecialVectors, R 816
- ContainedTom, R 713
- ContainingTom, R 713
- continuation, E 24
- ContinuedFractionApproximationOfRoot, R 143
- ContinuedFractionExpansionOfRoot, R 143
- Continued Fractions, *R 143*

- continue statement, R 55
  - Conventions for Character Tables, R 730
  - convert, to a string, R 252
  - Converting Groups to Finitely Presented Groups, R 472
  - ConvertToCharacterTable, R 729
  - ConvertToCharacterTableNC, R 729
  - ConvertToMatrixRep, R 236
  - ConvertToMatrixRepNC, R 236
  - ConvertToRangeRep, R 208
  - ConvertToStringRep, R 252
  - ConvertToTableOfMarks, R 707
  - ConvertToVectorRep, R 216
  - ConvertToVectorRepNC, R 216
  - ConwayPolynomial, R 588
  - Conway Polynomials, R 588
  - coprime, R 48
  - Copy, T 80
  - copy, R 113
    - an object, R 113
  - COPY\_LIST\_ENTRIES, R 178
  - Copying Weak Pointer Objects, E 53
  - CopyOptionsDefaults, R 425
  - Copyrights, R 844
  - CopyStabChain, R 425
  - Core, R 361
  - CorrespondingGeneratorsByModuloPcgs, R 443
  - coset, R 356
  - CosetLeadersMatFFE, R 219
  - Cosets, R 356
  - CosetTable, R 466
  - CosetTableBySubgroup, R 467
  - CosetTableDefaultLimit, R 468
  - CosetTableDefaultMaxLimit, R 468
  - CosetTableFromGensAndRels, R 467
  - CosetTableInWholeGroup, R 470
  - CosetTableOfFpSemigroup, R 553
  - Coset Tables and Coset Enumeration, R 466
  - Coset tables for subgroups in the whole group, R 470
  - CosetTableStandard, R 469
  - CRC, R 37
  - CrcFile, R 95
    - example, R 37
  - CRC Numbers, R 37
  - CreateCompletionFiles, R 34
  - CreateCompletionFilesPackage, E 40
  - CreateCompletionFilesPkg, R 849
  - Creating Attributes and Properties, P 17
  - Creating Categories, P 16
  - Creating Character Tables, R 726
  - Creating Class Functions from Values Lists, R 774
  - Creating Class Functions using Groups, R 775
  - Creating Families, P 18
  - Creating Finite Fields, R 586
  - Creating Finitely Presented Groups, R 463
  - Creating Finitely Presented Semigroups, R 549
  - Creating Group Homomorphisms, R 384
  - Creating Groups, R 349
  - Creating hom cosets and quotient groups, N 14
  - Creating Mappings, R 304
  - Creating Objects, P 20
  - Creating Operations, P 18
  - Creating Other Filters, P 18
  - Creating Own Arithmetic Objects, P 42
  - Creating Permutations, R 414
  - Creating Presentations, R 481
  - Creating Representations, P 17
  - Creating Types, P 20
  - Creation of Algebraic Extensions, R 691
  - Creation of Rational Functions, R 689
  - Credit, R 21
  - CrystGroupDefaultAction, R 434
  - Cycle, R 405
  - CycleLength, R 405
  - CycleLengths, R 405
  - Cycles, R 405
  - CycleStructureClass, R 779
  - CycleStructurePerm, R 413
  - CyclicExtensionsTom, R 713
  - CyclicGroup, R 510
  - CyclotomicField, R 591
  - cyclotomic field elements, R 157
  - cyclotomic fields, canonicalbasis, R 594
  - CyclotomicPolynomial, R 676
  - Cyclotomic Polynomials, R 676
  - Cyclotomics, R 157
  - cyclotomics, defaultfield, R 592
- ## D
- $d_N$ , R 161
  - Darstellungsgruppe, see EpimorphismSchurCover, R 382
  - DataType, R 125
  - data type, unknown, R 167
  - DayDMY, R 259
  - DaysInMonth, R 258

- DaysInYear, R 258
- Debugging, *T* 86
- Debugging Recursion, *R* 85
- DEC, R 244
- Declaration and Implementation Part, *E* 38, *P* 33
- DeclareAttribute, P 31
  - example, P 38
- DeclareAutoPackage, R 849
- DeclareAutoreadableVariables, *E* 40
- DeclareAutoreadableVariables, *E* 40
- DeclareCategory, P 31
- DeclareFilter, P 31
- DeclareGlobalFunction, P 32
- DeclareGlobalVariable, P 32
- DeclareHandlingByNiceBasis, R 612
- DeclareInfoClass, R 80
- DeclareOperation, P 32
- DeclarePackage, R 849
- DeclarePackageAutoDocumentation, R 849
- DeclarePackageDocumentation, R 849
- DeclareProperty, P 31
- DeclareRepresentation, P 31
  - belongs to implementation part, P 33
  - example, P 39
- DeclareSynonym, P 32
- DeclareSynonymAttr, P 33
- DecodeTree, R 499
- DecodeTree, *R* 499
- decompose, a group character, R 777
- DecomposedFixedPointVector, R 713
- DecomposeTensorProduct, R 657
- Decomposition, R 244
- DecompositionInt, R 245
- DecompositionMatrix, R 743
- decomposition matrix, R 244
- Decompositions, *R* 244
- Decreased, R 786
- DefaultField, R 578
  - for cyclotomics, R 160
  - for finite field elements, R 586
- DefaultFieldByGenerators, R 578
- DefaultFieldOfMatrix, R 225
- DefaultFieldOfMatrixGroup, R 429
- DefaultRing, R 561
  - for finite field elements, R 586
- DefaultRingByGenerators, R 562
- DefaultStabChainOptions, R 422
- Defining a Pcgs Yourself, *R* 436
- DefiningPolynomial, R 579
- DefiningQuotientHomomorphism, R 476
- DegreeFFE, R 585
- DegreeIndeterminate, R 674
- DegreeOfBinaryRelation, R 315
- DegreeOfCharacter, R 777
- DegreeOfLaurentPolynomial, R 673
- DegreeOfTransformation, R 554
- DegreeOfTransformationSemigroup, R 540
- DegreeOverPrimeField, R 579
- Delta, R 824
- Denominator, *T* 79
  - denominator, of a rational, R 146
- DenominatorCyc, R 160
- DenominatorOfModuloPcgs, R 442
- DenominatorOfRationalFunction, R 672
- DenominatorRat, R 146
- DenseHashTable, *N* 11
- Dense hash tables, *N* 11
- DenseIntKey, *N* 11
- deprecated, R 849
- DepthOfPcElement, R 438
- DepthOfUpperTriangularMatrix, R 234
- DepthVector, *T* 79
- Derangements, R 151
- Derivations, R 641
- Derivative, R 675
- DerivedLength, R 370
- DerivedSeriesOfGroup, R 370
- DerivedSubgroup, R 362
- DerivedSubgroupsTom, R 712
- DerivedSubgroupsTomPossible, R 712
- DerivedSubgroupsTomUnique, R 712
- DerivedSubgroupTom, R 712
- DescriptionOfRootOfUnity, R 160
- Designing new Multiplicative Objects, *P* 65
- Determinant, R 226
  - determinant character, R 780
- DeterminantIntMat, R 244
- DeterminantMat, R 226
- DeterminantMatDestructive, R 226
- DeterminantMatDivFree, R 226
- Determinant of an integer matrix, *R* 244
- DeterminantOfCharacter, R 780
- Developing rewriting systems, *R* 347
- DiagonalizeIntMat, R 242
- DiagonalizeMat, R 231
- DiagonalMat, R 227

- DiagonalOfMat, R 234
- Dictionaries, *N* 9
- DictionaryByPosition, *N* 10
- Difference, R 275
- DifferenceBlist, R 211
- Different Notions of Generation, *T* 81
- DihedralGroup, R 511
- Dimension, R 575
- DimensionOfHighestWeightModule, R 657
- DimensionOfMatrixGroup, R 429
- DimensionOfVectors, R 607
- DimensionsLoewyFactors, R 371
- DimensionsMat, R 225
- Directories, *R* 91
- DirectoriesLibrary, R 91
- DirectoriesPackageLibrary, R 847
- DirectoriesPackagePrograms, R 848
- DirectoriesSystemPrograms, R 92
- Directory, R 91
- DirectoryContents, R 92
- DirectoryCurrent, R 91
- DirectoryTemporary, R 91
- DirectProduct, R 504
- Direct product chain subgroups, *N* 21
- DirectProductOp, R 504
- Direct Products, *R* 504
- DirectSumDecomposition, R 626
  - for Lie algebras, R 645
- Direct Sum Decompositions, *R* 645
- DirectSumOfAlgebraModules, R 637
  - for Lie algebras, R 660
- DirectSumOfAlgebras, R 625
- DisableAttributeValueStoring, R 123
- disable automatic loading, R 845
- Discriminant, R 675
- Display, R 67
  - for character tables, R 774
  - for tables of marks, R 705
- DisplayCacheStats, R 84
- DisplayCompositionSeries, R 369
- DisplayEggBoxOfDClass, R 542
- DisplayImfInvariants, R 531
- DisplayInformationPerfectGroups, R 524
- DisplayOptions, R 749
- DisplayOptionsStack, R 89
- DisplayProfile, R 83
- DisplayRevision, R 84
- DistancesDistributionMatFFVecFFE, R 219
- DistancesDistributionVecFFesVecFFE, R 219
- DistanceVecFFE, R 219
- Distinguished Subalgebras, *R* 642
- division, R 48
  - operation, R 296
- DivisionRingByGenerators, R 578
- division rings, R 577
- divisors, of an integer, R 134
- DivisorsInt, R 134
- Dixon-Schneider algorithm, R 753
- DixonInit, R 754
- DixonRecord, R 754
- DixonSplit, R 754
- DixontinI, R 754
- DMYDay, R 259
- DMYhmsSeconds, R 260
- DnLattice, R 787
- DnLatticeIterative, R 788
- do, R 53
- document formats, for help books, *E* 43
- document formats (text, dvi, ps, pdf, html), *R* 23
- Domain, R 292
- DomainByGenerators, R 292
- Domain Categories, *R* 289
- Domain Constructors, *T* 70
- Domains, *R* 110
- Domains as Sets, *T* 68
- Domains Generated by Class Functions, *R* 800
- Domains of Subspaces of Vector Spaces, *R* 600
- DominantCharacter, R 656
- DominantWeights, R 656
- DoubleCoset, R 358
- DoubleCosetRepsAndSizes, R 359
- Double Cosets, *R* 358
- DoubleCosets, operation, R 358
- DoubleCosetsNC, operation, R 358
- DoubleHashArraySize, *N* 11
- doublequote character, R 251
- doublequotes, R 249
- DownEnv, R 71, *T* 86
- Dummy Streams, *R* 106
- duplicate free, R 194
- DuplicateFreeList, R 199
- Duplication of Lists, *R* 180
- Duplication of Objects, *R* 113
- DxIncludeIrreducibles, R 754

## E

- E, R 157
- $e_N$ , R 161
- EANormalSeriesByPcgs, R 444
- Earns, R 406
- EB, R 161
- EC, R 161
- Echelonized Matrices, *R 231*
- ED, R 161
- Edit, R 75
- Editing Files, *R 75*
- Editor Support, *R 75*
- EE, R 161
- EF, R 161
- Efficiency of Homomorphisms, *R 387*
- EG, R 161
- EggBoxOfDCClass, R 542
- EH, R 161
- EI, R 162
- Eigenspaces, R 230
- Eigenvalues, R 230
- EigenvaluesChar, R 780
- Eigenvectors, R 230
- Eigenvectors and eigenvalues, *R 230*
- EJ, R 162
- EK, R 162
- EL, R 162
- ElementaryAbelianGroup, R 511
- ElementaryAbelianSeries, R 370
- ElementaryAbelianSeriesLargeSteps, R 370
- Elementary Divisors, *R 231*
- ElementaryDivisorsMat, R 231
- ElementaryDivisorsMatDestructive, R 231
- Elementary Operations for a Pcgs, *R 437*
- Elementary Operations for a Pcgs and an Element, *R 438*
- Elementary Operations for Integers, *R 127*
- Elementary Operations for Rationals, *R 145*
- Elementary Tietze Transformations, *R 492*
- ElementOffFpGroup, R 465
- ElementOffFpSemigroup, R 551
- ElementOfMagmaRing, R 664
- ElementOrdersPowerMap, R 803
- ElementProperty, R 426
- Elements, R 272, T 79
- elements, T 24
  - definition, R 109
  - of a list or collection, R 272
- Elements as equivalence classes, *R 109*
- ElementsFamily, P 20, R 267
- Elements in Algebraic Extensions, *R 691*
- Elements of Finitely Presented Groups, *T 84*
- Elements of Free Magma Rings, *R 664*
- Elements of pc groups, *R 453*
- ElementsStabChain, R 424
- Elements with Prescribed Images, *R 402*
- element test, for lists, R 182
- elif, R 51
- EliminatedWord, R 335
- EliminationOrdering, R 684
- ElmWPObj, E 52
- else, R 51
- EM, R 162
- emacs, R 75
- email addresses, T 16
- Embedding, R 305
  - example for direct products, R 504
  - example for semidirect products, R 506
  - example for wreath products, R 507
  - for group products, R 509
  - for Lie algebras, R 640
  - for magma rings, R 664
- embeddings, find all, R 393
- Embeddings and Projections for Group Products, *R 509*
- EmptyBinaryRelation, R 314
- EmptyMatrix, R 227
- EmptyPlist, R 182
- EmptySCTable, R 616
- EmptyStabChain, R 425
- EmptyString, R 252
- EnableAttributeValueStoring, R 123
- End, R 610
- end, R 55
- Enforcing Property Tests, *P 37*
- Enlarging Internally Represented Lists, *R 182*
- Enumerator, R 268
- enumerator, T 49
- EnumeratorByBasis, R 603
- EnumeratorByFunctions, R 269
- Enumerators, *R 208*
- EnumeratorSorted, R 268
- environment, R 55
- Epicentre, R 382
- EpimorphismFromFreeGroup, R 353
- EpimorphismNilpotentQuotient, R 477
- EpimorphismNonabelianExteriorSquare, R 382

- EpimorphismPGroup, R 477
- EpimorphismQuotientSystem, R 477
- epimorphisms, find all, R 393
- EpimorphismSchurCover, R 382
- equality, associative words, R 333
  - elements of finitely presented groups, R 464
  - nonassociative words, R 327
  - of records, R 264
  - operation, R 295
  - pcwords, R 453
- Equality and Comparison of Domains, R 287
- equality test, R 47
  - for permutations, R 412
- equivalence class, R 318
- Equivalence Classes, R 318
- EquivalenceClasses, attribute, R 318
- EquivalenceClassOfElement, R 318
- EquivalenceClassOfElementNC, R 318
- EquivalenceClassRelation, R 318
- equivalence relation, R 317
- EquivalenceRelationByPairs, R 317
- EquivalenceRelationByPairsNC, R 317
- EquivalenceRelationByPartition, R 317
- EquivalenceRelationByPartitionNC, R 317
- EquivalenceRelationByProperty, R 317
- EquivalenceRelationByRelation, R 317
- EquivalenceRelationPartition, R 317
- Equivalence Relations, R 317
- ER, R 162
- Error, R 73
- Error, R 73
- ErrorCount, R 73
- ErrorCount, R 73
- ErrorNoTraceBack, R 69
- errors, syntax, R 64
- ES, R 162
- escaped characters, R 251
- escaping non-special characters, R 251
- ET, R 162
- EU, R 162
- EuclideanDegree, R 569
- EuclideanQuotient, R 569
- EuclideanRemainder, R 570
- Euclidean Rings, R 569
- Euler's totient function, R 138
- EulerianFunction, R 368
- EulerianFunctionByTom, R 714
- EV, R 162
- EvalStraightLineProgElm, R 343
- EvalString, R 258
- evaluation, R 42
  - strings, R 257
- EW, R 162
- EX, R 162
- ExactSizeConsiderFunction, R 378
- Example – Constructing Enumerators, P 24
- Example – Constructing Iterators, P 26
- Example: Groups with a decomposition as semidirect product, P 42
- Example: Groups with a word length, P 42
- Example: M-groups, P 41
- Examples, Lists, and Verbatim, E 20
- Exec, R 108
- Exec, R 108
- execution, R 49
- exit, R 73
- expanded form of monomials, R 688
- Expert Windows installation, R 843
- Exponent, R 368
  - for character tables, R 735
- exponent, of the prime residue group, R 139
- exponentiation, operation, R 296
- ExponentOfPcElement, R 438
- ExponentsConjugateLayer, R 439
- ExponentsOfCommutator, R 439
- ExponentsOfConjugate, R 439
- ExponentsOfPcElement, R 438
- ExponentsOfRelativePower, R 439
- Exponents of Special Products, R 439
- ExponentSumWord, R 334
- ExponentSyllable, R 336
- Expressing Group Elements as Words in Generators, R 353
- Expressions, R 42
- ExtendedGroup, N 20
- ExtendedPcgs, R 441
- Extending the Range of Definition of an Existing Operation, P 36
- ExtendSchreierTransversal, N 17
- ExtendSchreierTransversalShortCube, N 17
- ExtendSchreierTransversalShortTree, N 17
- ExtendStabChain, R 425
- Extension, R 458
- ExtensionNC, R 458
- ExtensionRepresentatives, R 459
- Extensions, R 458

- Extensions of the p-adic Numbers, *R 694*
- ExteriorCentre, *R 382*
- ExteriorPowerOfAlgebraModule, *R 660*
- ExternalOrbit, *R 409*
- ExternalOrbits, *R 409*
- ExternalOrbitsStabilizers, *R 409*
- External Representation, *P 28*
- External Representation for Nonassociative Words, *R 329*
- external representation of polynomials, *R 688*
- ExternalSet, *E 48, R 408*
- external set, *T 48*
- External Sets, *R 408*
- ExternalSubset, *R 409*
- Extract, *R 784*
- ExtraspecialGroup, *R 511*
- ExtRepDenominatorRatFun, *R 688*
- ExtRepNumeratorRatFun, *R 688*
- ExtRepOfObj, *P 29*
  - external representation, for cyclotomics, *R 160*
- ExtRepPolynomialRatFun, *R 688*
- EY, *R 162*
- F**
- F, Function mark-up, *E 16*
- $f_N$ , *R 161*
- FactorCosetAction, *R 404*
  - for fp groups, *R 467*
- FactorCosetOperation, *R 467*
- FactorFreeSemigroupByRelations, *R 549*
- FactorGroup, *R 372*
- FactorGroupFpGroupByRels, *R 463*
- FactorGroupNC, *R 372*
- FactorGroupNormalSubgroupClasses, *R 765*
- Factor Groups, *R 372*
- Factor Groups of Polycyclic Groups - Modulo Pcgs, *R 442*
- Factor Groups of Polycyclic Groups in their Own Representation, *R 443*
- FactorGroupTom, *R 714*
- Factorial, *R 147*
- Factorization, *R 354*
- factorization, *R 353*
- Factors, *R 569*
  - of univariate polynomial, *R 677*
- FactorsInt, *R 132*
- FactorsOfDirectProduct, *R 758*
- FactorsSquarefree, *R 677*
- Fail, *R 169, T 77*
- fail, *R 169*
- fail instead of false, *T 77*
- FaithfulModule, *R 636*
  - for Lie algebras, *R 654*
- Families, *R 116*
- FamiliesOfGeneralMappingsAndRanges, *R 313*
- FamiliesOfRows, *R 764*
- family, *T 31*
- FamilyForOrdering, *R 281*
- FamilyObj, *R 116*
- FamilyPcgs, *R 453*
- FamilyRange, *R 313*
- FamilySource, *R 313*
- FAQ, *R 836*
- Fast access to last hash index, *N 12*
- features, under UNIX, *R 27*
- fi, *R 51*
- Fibonacci, *R 155*
- Fibonacci and Lucas Sequences, *R 155*
- Field, *R 577*
- FieldExtension, *R 579*
- field homomorphisms, Frobenius, *R 588*
- FieldOfMatrixGroup, *R 429*
- FieldOverItselfByGenerators, *R 579*
- fields, *R 577*
- File Access, *R 93*
- FileDescriptorOfStream, *R 98*
- Filename, *R 92*
- Filename, *R 92*
- File Operations, *R 94*
- File Streams, *R 103*
- File Structure, *E 32*
- File Types, *E 32*
- Filtered, *R 202*
- Filters, *R 117*
- filters, *T 73*
- Filters Controlling the Arithmetic Behaviour of Lists, *R 184*
- Finding Implementations in the Library, *E 33*
- Finding Positions in Lists, *R 190*
- Finding Submodules, *R 697*
- FindS12, *R 652*
- Finish Installation and Cleanup, *R 834*
- Finite Field Elements, *R 583*
- Finitely Presented Lie Algebras, *R 652*
- Finitely presented monoids, *R 551*
- finiteness test, for a list or collection, *R 272*



- Finite Perfect Groups, *R 522*
- First, *R 203*
- FittingSubgroup, *R 363*
- Flat, *R 199*
- FlushCaches, *P 33*
- flush character, *R 251*
- foa triples, *E 46*
- For, *R 53*
- ForAll, *R 203*
- For and While Loops, *T 33*
- ForAny, *R 203*
- for loop, *R 53*
- Forming Closures of Domains, *T 70*
- FpElmComparisonMethod, *R 464*
- FpGroupPresentation, *R 482*
- FpGrpMonSmsgOfFpGrpMonSmsgElement, *R 549*
- FpLieAlgebraByCartanMatrix, *R 653*
- frame, *R 790*
- FrattiniSubgroup, *R 363*
  - for groups with pcgs, *R 450*
- FreeAlgebra, *R 615*
- FreeAlgebraWithOne, *R 615*
- FreeAssociativeAlgebra, *R 615*
- FreeAssociativeAlgebraWithOne, *R 615*
- FreeGeneratorsOfFpGroup, *R 464*
- FreeGeneratorsOfFpSemigroup, *R 550*
- FreeGeneratorsOfWholeGroup, *R 464*
- FreeGroup, *R 331*
- FreeGroupOfFpGroup, *R 464*
- Free Groups, Monoids and Semigroups, *R 331*
- FreeLeftModule, *R 575*
- FreeLieAlgebra, *R 641*
- FreeMagma, *R 328*
- FreeMagmaRing, *R 663*
- Free Magma Rings, *R 663*
- Free Magmas, *R 328*
- FreeMagmaWithOne, *R 328*
- Free Modules, *R 575*
- FreeMonoid, *R 546*
  - with example, *R 331*
- FreeMonoidOfRewritingSystem, *R 553*
- FreeProduct, *R 509*
- Free Products, *R 509*
- FreeSemigroup, *R 331*
  - with examples, *R 539*
- FreeSemigroupOfFpSemigroup, *R 550*
- FreeSemigroupOfRewritingSystem, *R 553*
- Frobenius automorphism, *R 588*
- FrobeniusAutomorphism, *R 588*
- FrobeniusAutomorphism, *R 588*
- FrobeniusCharacterValue, *R 799*
- FullMatrixAlgebra, *R 618*
- FullMatrixAlgebraCentralizer, *R 626*
- FullMatrixLieAlgebra, *R 641*
- FullMatrixModule, *R 576*
- FullMatrixSpace, *R 607*
- FullRowModule, *R 576*
- FullRowSpace, *R 607*
- FullTransformationSemigroup, *R 540*
- Function, *R 55*
- function, *R 55*
- FunctionAction, *R 408*
- function call, *R 46*
  - with arguments, *R 46*
  - with options, *R 47*
- Function Calls, *R 46*
- FunctionOperation, *R 849*
- functions, *R 61*
  - definition by arrow notation, *R 57*
  - definition of, *R 55*
  - recursive, *R 55*
  - with a variable number of arguments, *R 56*
- FunctionsFamily, *R 63*
- Functions for Coding Theory, *R 219*
- Functions for GAP Packages, *R 846*
- Functions that do nothing, *R 63*
- Function that Modify Boolean Lists, *R 212*
- Function Types, *R 63*
- Further Improvements in Implementing Residue Class Rings, *P 62*
- Further Information about Domains, *T 71*
- Further Information about Functions, *T 43*
- Further Information about GAP, *T 16*
- Further Information about Groups and Homomorphisms, *T 58*
- Further Information about Lists, *T 39*
- Further Information about Vector Spaces and Algebras, *T 67*
- Further Information introducing the System, *T 26*
- FusionCharTableTom, *R 720*
- FusionConjugacyClasses, *R 806*
- FusionConjugacyClassesOp, *R 806*
- fusions, *R 805*
- FusionsAllowedByRestrictions, *R 821*
- FusionsTom, *R 709*

**G**

- G*-sets, E 48, R 396
- $g_N$ , R 161
- gac*, R 35
- Galois Action, *R 579*
- Galois Conjugacy of Cyclotomics, *R 164*
- GaloisCyc, R 164
  - for class functions, R 773
- GaloisField, R 587
- GaloisGroup, of field, R 580
  - of rational class of a group, R 361
- Galois Groups of Abelian Number Fields, *R 596*
- GaloisMat, R 165
- GaloisStabilizer, R 593
- GaloisType, R 678
- gap.rc*, R 33
- GAP3, R 34
- Gap3CatalogueIdGroup, R 520
- GAPDocManualLab, E 41
- GAP for Macintosh OS X, *R 840*
- GAP for MacOS, *R 841*
- GAPInfo, R 850
- GAPInfo.RootPaths, R 29
- GAPInfo.Version, E 40
- GapInputPcGroup, R 457
- GapInputSCTable, R 616
- GAPKB\_REW, R 552
- gapmacro.tex*, E 11
- GAP Root Directory, *R 90*
- GasmanLimits, R 87
- GasmanMessageStatus, R 87
- GasmanStatistics, R 87
- Gaussian algorithm, R 229
- GaussianIntegers, R 597
- GaussianRationals, R 592
- Gaussians, *R 597*
- Gcd, R 570
- Gcd and Lcm, *R 570*
- Gcdex, R 130
- GcdInt, R 129
- GcdOp, R 570
- GcdRepresentation, R 570
- GcdRepresentationOp, R 571
- General Binary Relations, *R 314*
- General hash table definitions and operations, *N 10*
- General Hash Tables, *N 10*
- GeneralisedEigenspaces, R 230
- GeneralisedEigenvalues, R 230
- generalized characters, R 767
- Generalized Conjugation Technique, *E 54*
- generalized conjugation technique, E 54
- GeneralizedEigenspaces, R 230
- GeneralizedEigenvalues, R 230
- GeneralLinearGroup, R 513
- GeneralMappingByElements, R 304
- General Mappings, *R 312*
- GeneralMappingsFamily, R 313
- General operations on transversals, *N 16*
- GeneralOrthogonalGroup, R 514
- GeneralUnitaryGroup, R 513
- Generating Fields, *R 577*
- Generating modules, *R 573*
- Generating Rings, *R 561*
- GeneratingSetIsComplete, N 19
- generator, of the prime residue group, R 140
- GeneratorsOfAdditiveGroup, R 559
- GeneratorsOfAdditiveMagma, R 559
- GeneratorsOfAdditiveMagmaWithZero, R 559
- GeneratorsOfAlgebra, R 622
- GeneratorsOfAlgebraModule, R 633
- GeneratorsOfAlgebraWithOne, R 622
- GeneratorsOfDivisionRing, R 578
- GeneratorsOfDomain, R 292
- GeneratorsOfEquivalenceRelationPartition, R 317
- GeneratorsOfField, R 578
- GeneratorsOfGroup, R 350
- GeneratorsOfIdeal, R 564
- GeneratorsOfLeftIdeal, R 565
- GeneratorsOfLeftModule, R 573
- GeneratorsOfLeftOperatorAdditiveGroup, R 573
- GeneratorsOfLeftVectorSpace, R 599
- GeneratorsOfMagma, R 322
- GeneratorsOfMagmaWithInverses, R 322
- GeneratorsOfMagmaWithOne, R 322
- GeneratorsOfMonoid, R 545
- GeneratorsOfNearAdditiveGroup, R 559
- GeneratorsOfNearAdditiveMagma, R 559
- GeneratorsOfNearAdditiveMagmaWithZero, R 559
- GeneratorsOfPresentation, R 481
- GeneratorsOfRightIdeal, R 565
- GeneratorsOfRightModule, R 574
- GeneratorsOfRightOperatorAdditiveGroup, R 574
- GeneratorsOfRing, R 562
- GeneratorsOfRingWithOne, R 566

GeneratorsOfRws, R 345  
 GeneratorsOfSemigroup, R 539  
 GeneratorsOfSomething, T 69  
 GeneratorsOfStruct, R 288  
 GeneratorsOfTwoSidedIdeal, R 564  
 GeneratorsOfVectorSpace, R 599  
 GeneratorsPrimeResidues, R 139  
 GeneratorsSmallest, R 379  
 GeneratorsSubgroupsTom, R 718  
 GeneratorSyllable, R 336  
 Generic Construction of Tables of Marks, R 722  
 GetFusionMap, R 807  
 GetHashEntry, N 10  
 GetHashEntryAtLastIndex, N 12  
 GetHashEntryIndex, N 11  
 getter, of an attribute, T 72  
 Get the Archives, R 831  
 getting help, R 22  
 GF, R 587  
 GL, R 513  
 GL and SL, R 430  
 Global Memory Information, R 87  
 GlobalMersenneTwister, R 136  
 GlobalRandomSource, R 136  
 Global Variables in the Library, P 31  
 GModuleByMats, R 696  
 GO, R 514  
 GQuotients, R 393  
 Grading, R 627  
 Green's Relations, R 541  
 GreensDClasses, R 543  
 GreensDClassOfElement, R 542  
 GreensDRelation, R 542  
 GreensHClasses, R 543  
 GreensHClassOfElement, R 542  
 GreensHRelation, R 542  
 GreensJClasses, R 543  
 GreensJClassOfElement, R 542  
 GreensJRelation, R 542  
 GreensLClasses, R 543  
 GreensLClassOfElement, R 542  
 GreensLRelation, R 542  
 GreensRClasses, R 543  
 GreensRClassOfElement, R 542  
 GreensRRelation, R 542  
 Groebner Bases, R 685  
 GroebnerBasis, R 685  
 GroebnerBasisNC, R 685

Group, R 349  
 group actions, R 396  
     operations syntax, R 396  
 Group Actions - Name Changes, R 849  
 group algebra, R 662  
 Group Automorphisms, R 389  
 GroupByRws, R 455  
 GroupByRwsNC, R 455  
 group characters, R 767  
 Group Elements, R 349  
 group general mapping, T 55  
     single-valued, T 55  
     total, T 55  
 GroupGeneralMappingByImages, R 385  
 GroupHClassOfGreensDClass, R 543  
 GroupHomomorphismByFunction, R 385  
 GroupHomomorphismByImages, R 384  
 GroupHomomorphismByImagesNC, R 384  
 GroupHomomorphismByImages vs. GroupGeneralMappingByImages, T 55  
 Group Homomorphisms, Group Homomorphisms, by Images, T 54  
 GroupOfPcgs, R 437  
 group operations, R 849  
 Group Properties, R 366  
 GroupRing, R 663  
 group ring, R 662  
 Groups of Automorphisms, R 391  
 GroupStabChain, R 424  
 GroupWithGenerators, R 350  
 GU, R 513

## H

$h_N$ , R 161  
 HallSubgroup, R 364  
 HallSystem, R 365  
     for groups with pcgs, R 450  
 Handling of Streams in the Background, R 106  
 HasAbelianFactorGroup, R 372  
 HasChainHomomorphicImage, N 20  
 HasElementaryAbelianFactorGroup, R 372  
 HashFunct, N 11  
 HashKeyEnumerator, N 10  
 Hash keys, N 11  
 HasIndeterminateName, R 669  
 HasParent, R 290  
 HasseDiagramBinaryRelation, R 316  
 HeadPcElementByNumber, R 439

- Help, *T* 25
- HELP\_ADD\_BOOK, *E* 42
- HenselBound, *R* 678
- hermite normal form, *R* 850
- HermiteNormalFormIntegerMat, *R* 242
- HermiteNormalFormIntegerMatTransform, *R* 242
- HeuristicCancelPolynomials, *R* 690
- HexStringInt, *R* 254
- HighestWeightModule, *R* 659
- History of Character Theory Stuff in GAP, *R* 725
- HMSMSec, *R* 259
- Hom, *R* 610
- HomCoset, *N* 14
- Hom coset chain subgroups, *N* 21
- HomCosetWithImage, *N* 14
- HomeEnumerator, *R* 408
- Homomorphism, for quotient groups by
  - homomorphisms, *N* 14
  - for subgroup transversals, *N* 17
- homomorphism, action, *T* 48
  - natural, *T* 45
  - operation, *T* 48
- Homomorphism for very large groups, *R* 388
- HomomorphismQuotientSemigroup, *R* 541
- homomorphisms, find all, *R* 393
- homomorphisms, Frobenius, field, *R* 588
- Homomorphisms of Algebras, *R* 628
- Homomorphisms vs. Factor Structures, *T* 83
- Homomorphisms vs. General Mappings, *T* 83
- HomomorphismTransformationSemigroup, *R* 540
- HomTransversal, *N* 17
- How to Implement New Kinds of Vector Spaces, *R* 612
- HumanReadableDefinition, *R* 716
- I**
- $i_N$ , *R* 162
- Ideal, *R* 563
- IdealByGenerators, *R* 564
- IdealNC, *R* 564
- Ideals, *R* 620
- Ideals in Rings, *R* 563
- Ideals of semigroups, *R* 540
- Idempotents, *R* 323
- IdempotentsTom, *R* 709
- IdempotentsTomInfo, *R* 709
- Identical Lists, *R* 179, *T* 29
- Identical Objects, *R* 110
- Identical Records, *R* 263
- IdentificationOfConjugacyClasses, *R* 731
- Identifier, for character tables, *R* 738
  - for tables of marks, *R* 710
- identifier, *T* 22
- Identifiers, *R* 42
- Identity, *R* 292
- IdentityBinaryRelation, *R* 314
- IdentityFromSCTable, *R* 617
- IdentityMapping, *R* 305
- IdentityMat, *R* 227
- IdentityTransformation, *R* 554
- IdFunc, *R* 63
- IdGap3SolvableGroup, *R* 520
- IdGroup, *R* 520
- IdSmallGroup, *R* 520
- IdsOfAllSmallGroups, *R* 520
- If, *R* 51
- if statement, *R* 51
- If Statements, *T* 41
- If Things Go Wrong, *R* 836
- Image, *R* 307
  - for Frobenius automorphisms, *R* 588
- image, vector under matrix, *R* 224
- ImageElm, *R* 307
- ImageElt, *N* 14
- ImageGroup, *N* 18
- ImageListOfTransformation, *R* 555
- Images, *R* 307
- ImagesElm, *R* 306
- ImageSetOfTransformation, *R* 555
- ImagesRepresentative, *R* 306
- ImagesSet, *R* 306
- ImagesSmallestGenerators, *R* 388
- ImagesSource, *N* 15, *R* 306
- Images under Mappings, *R* 306
- ImfInvariants, *R* 533
- ImfMatrixGroup, *R* 534
- ImfNumberQClasses, *R* 531
- ImfNumberQQClasses, *R* 531
- ImfNumberZClasses, *R* 531
- Immediate Methods, *P* 13
- Immutability, *T* 30
- Immutable, *R* 112
- ImmutableBasis, *R* 606
- ImmutableMatrix, *R* 236
- Immutable Objects, *T* 80
- Implementing New List Objects, *P* 23

- in, for collections, R 276
  - for lists, R 182
  - for strictly sorted lists, R 196
  - operation for, R 276
- IndependentGeneratorsOfAbelianGroup, R 379
- Indeterminate, R 668
- IndeterminateName, R 669
- Indeterminateness, R 815
- IndeterminateNumberOfLaurentPolynomial, R 679
- IndeterminateNumberOfUnivariateRationalFunction, R 669
- IndeterminateOfUnivariateRationalFunction, R 669
- Indeterminates, *R 668*
- IndeterminatesOfPolynomialRing, R 680
- Index, R 351
- indexing commands, E 16
- IndexInWholeGroup, R 351
- IndexNC, R 351
- Index numbers of primitive groups, *R 528*
- Indicator, R 745
- IndicatorOp, R 745
- IndicesCentralNormalSteps, R 444
- IndicesChiefNormalSteps, R 445
- IndicesEANormalSteps, R 444
- IndicesInvolutoryGenerators, R 469
- IndicesNormalSteps, R 446
- IndicesOfAdjointBasis, R 623
- IndicesPCentralNormalStepsPGroup, R 445
- IndicesStabChain, R 424
- Indirected, R 811
- Induced Actions, *R 698*
- InducedAutomorphism, R 392
- InducedClassFunction, R 781
- InducedClassFunctions, R 782
- InducedCyclic, R 782
- InducedPcgs, R 440
- InducedPcgsByGenerators, R 440
- InducedPcgsByGeneratorsNC, R 440
- InducedPcgsByPcSequence, R 440
- InducedPcgsByPcSequenceAndGenerators, R 441
- InducedPcgsByPcSequenceNC, R 440
- InducedPcgsWrtFamilyPcgs, R 453
- InducedPcgsWrtSpecialPcgs, R 448
- Inequalities, R 798
- inequality, of records, R 264
- inequality test, R 47
- InertiaSubgroup, R 779
- Infinity, *R 160*
- infinity, R 160
- inflated class functions, R 781
- Info, R 80
- InfoAlgebra, R 614
- InfoAttributes, R 123
- InfoBckt, R 426
- InfoCharacterTable, R 730
- InfoCoh, R 381
- InfoComplement, R 362
- InfoCoset, R 359
- InfoFpGroup, R 463
- Info Functions, *R 80*
- InfoGroebner, R 686
- InfoGroup, R 350
- InfoLattice, R 376
- InfoLevel, R 80
- InfoMatrix, R 222
- InfoMonomial, R 823
- InfoNumtheor, R 138
- InfoOptions, R 89
- InfoPcSubgroup, R 379
- Information about a function, *R 61*
- Information about the version used, *R 84*
- InfoText, R 738
- InfoTom, R 707
- InfoWarning, R 81
- Init, R 136
- init.g, for a GAP package, E 38
- InitFusion, R 820
- InitPowerMap, R 818
- Injection, N 18
- InjectionZeroMagma, R 321
- InnerAutomorphism, R 390
- InnerAutomorphismNC, R 390
- InnerAutomorphismsAutomorphismGroup, R 391
- inner product, of group characters, R 777
- In Parent Attributes, *E 47*
- InParentFOA, E 48
- Input-Output Streams, *R 104*
- InputLogTo, R 95
  - for streams, R 102
  - stop logging input, R 95
- InputOutputLocalProcess, R 105
- InputTextFile, R 103
- InputTextNone, R 106
- InputTextString, R 104

- InputTextUser, R 103
- InsertTrivialStabilizer, R 425
- InstallAtExit, R 73
- installation, R 830
- Installation of GAP for MacOS, *R 841*
- Installation of GAP Package Binaries, *E 38*
- Installation Overview, *R 830*
- InstallCharReadHookFunc, R 106
- InstalledPackageVersion, R 847
- InstallFactorMaintenance, R 298
- InstallFlushableValue, P 32
- InstallGlobalFunction, P 32
- InstallHandlingByNiceBasis, R 612
- InstallImmediateMethod, P 14
- Installing a GAP Package, *R 845*
- Installing a Help Book, *E 42*
- InstallIsomorphismMaintenance, R 298
- InstallMethod, P 11
- InstallOtherMethod, P 12
- InstallSubsetMaintenance, R 298
- InstallTrueMethod, P 14
- InstallValue, P 32
- Int, R 127
  - for cyclotomics, R 158
  - for strings, R 257
- INT\_CHAR, R 257
- integer part of a quotient, R 129
- Integers, R 126
- Integral Bases of Abelian Number Fields, *R 594*
- IntegralizedMat, R 245
- IntegratedStraightLineProgram, R 341
- IntermediateGroup, R 371
- IntermediateResultOfSLP, R 342
- IntermediateResultOfSLPWithoutOverwrite, R 342
- IntermediateResultsOfSLPWithoutOverwrite, R 342
- IntermediateSubgroups, R 371
- Internally Represented Cyclotomics, *R 166*
- Internally Represented Strings, *R 252*
- InterpolatedPolynomial, R 572
- IntersectBlist, R 212
- Intersection, R 274
  - for groups with pcgs, R 450
- intersection, of collections, R 274
  - of sets, R 197
- Intersection2, R 274
- IntersectionBlist, R 211
- IntersectionsTom, R 714
- IntersectSet, R 197
- IntFFE, R 586
- IntFFESymm, R 586
- IntHexString, R 257
- Introducing new Viewer for the Online Help, *E 45*
- IntScalarProducts, R 815
- IntVecFFE, R 586
- InvariantBilinearForm, R 431
- InvariantElementaryAbelianSeries, R 370
- Invariant Forms, *R 431*
- InvariantLattice, R 433
- InvariantQuadraticForm, R 431
- InvariantSesquilinearForm, R 431
- InvariantSubgroupsElementaryAbelianGroup, R 377
- Inverse, R 294
- inverse, group homomorphism, R 386
  - matrix, R 224
  - of class function, R 772
- InverseAttr, R 294
- InverseClasses, R 738
- InverseGeneralMapping, R 304
- InverseImmutable, R 294
- InverseMap, R 811
- InverseMatMod, R 238
- InverseMutable, R 294
- InverseOp, R 294
- InverseRepresentative, R 424
- InverseSameMutability, R 294
- InverseSM, R 294
- Invoking the Help, *R 22*
- Irr, R 734
- irrationalities, R 157
- IrrBaumClausen, R 751
- IrrConlon, R 751
- IrrDixonSchneider, R 751
- Irreducibility Tests, *R 697*
- irreducible character, R 776
- irreducible characters, computation, R 754
- IrreducibleDifferences, R 783
- Irreducible Maximal Finite Integral Matrix Groups, *R 530*
- IrreducibleModules, R 753
  - for groups with pcgs, R 450
- IrreducibleRepresentations, R 751
- IrreducibleRepresentationsDixon, R 752
- IrreducibleSolvableGroup, R 529

- IrreducibleSolvableGroupMS, R 529
- Irreducible Solvable Matrix Groups, *R 529*
- Is16BitsFamily, R 337
- Is32BitsFamily, R 337
- Is8BitsFamily, R 337
- IsAbelian, R 323
  - for character tables, R 735
- IsAbelianNumberField, R 593
- IsAbelianNumberFieldPolynomialRing, R 681
- IsAbelianTom, R 711
- IsAdditiveElement, R 299
- IsAdditiveElementWithInverse, R 299
- IsAdditiveElementWithZero, R 299
- IsAdditiveGroup, R 558
- IsAdditiveGroupGeneralMapping, R 311
- IsAdditiveGroupHomomorphism, R 311
- IsAdditivelyCommutative, R 559
- IsAdditivelyCommutativeElement, R 301
- IsAdditivelyCommutativeElementCollColl, R 301
- IsAdditivelyCommutativeElementCollection, R 301
- IsAdditivelyCommutativeElementFamily, R 301
- IsAdditiveMagma, R 557
- IsAdditiveMagmaWithInverses, R 558
- IsAdditiveMagmaWithZero, R 557
- IsAlgebra, R 621
- IsAlgebraGeneralMapping, R 312
- IsAlgebraHomomorphism, R 312
- IsAlgebraicElement, R 692
- IsAlgebraicExtension, R 691
- IsAlgebraModuleElement, R 633
- IsAlgebraModuleElementCollection, R 633
- IsAlgebraModuleElementFamily, R 633
- IsAlgebraWithOne, R 621
- IsAlgebraWithOneGeneralMapping, R 312
- IsAlgebraWithOneHomomorphism, R 312
- IsAlphaChar, R 253
- IsAlternatingGroup, R 417
- IsAnticommutative, R 567
- IsAntisymmetricBinaryRelation, R 315
- IsAssociated, R 568
- IsAssociative, R 323
- IsAssociativeElement, R 301
- IsAssociativeElementCollColl, R 301
- IsAssociativeElementCollection, R 301
- IsAssocWord, R 330
- IsAssocWordWithInverse, R 330
- IsAssocWordWithOne, R 330
- IsAttributeStoringRep, P 38
- IsAutomorphismGroup, R 391
- IsBasicWreathLessThanOrEqual, R 333
- IsBasicWreathProductOrdering, R 285
- IsBasis, R 601
- IsBasisByNiceBasis, R 612
- IsBasisOfAlgebraModuleElementSpace, R 634
- IsBergerCondition, R 824
- IsBijection, T 79
- IsBijective, R 306
- IsBinaryRelation, R 314
  - same as IsEndoGeneralMapping, R 314
- IsBLetterAssocWordRep, R 337
- IsBLetterWordsFamily, R 337
- IsBlist, R 210
- IsBlockMatrixRep, R 239
- IsBool, R 169
- IsBound, for lists, R 178
- IsBound and Unbind for Lists, *R 178*
- IsBound and Unbind for Records, *R 265*
- IsBoundElmWPObj, E 52
- IsBoundGlobal, R 45
- IsBrauerTable, R 729
- IsBravaisGroup, R 433
- IsBuiltFromAdditiveMagmaWithInverses, R 346
- IsBuiltFromGroup, R 346
- IsBuiltFromMagma, R 346
- IsBuiltFromMagmaWithInverses, R 346
- IsBuiltFromMagmaWithOne, R 346
- IsBuiltFromSemigroup, R 346
- IsCanonicalBasis, R 604
- IsCanonicalBasisFullMatrixModule, R 608
- IsCanonicalBasisFullRowModule, R 608
- IsCanonicalNiceMonomorphism, R 389
- IsCanonicalPcgs, R 441
- IsCentral, R 323
- IsCentralFactor, R 382
- IsChainTypeGroup, N 19
- IsChar, R 249
- IsCharacter, R 776
- IsCharacteristicSubgroup, R 352
- IsCharacterTable, R 729
- IsCharacterTableInProgress, R 729
- IsCharCollection, R 249
- IsCheapConwayPolynomial, R 589
- IsClassFunction, R 767
- IsClassFusionOfNormalSubgroup, R 745

- IsClosedStream, R 97
- IsCochain, R 655
- IsCochainCollection, R 655
- IsCollection, R 267
- IsCollectionFamily, R 267
- IsCommutative, R 323
- IsCommutativeElement, R 301
- IsCommutativeElementCollColl, R 301
- IsCommutativeElementCollection, R 301
- IsComponentObjectRep, P 39
- IsCompositionMappingRep, R 304
- IsConfluent, R 344
  - for pc groups, R 455
- IsConjugacyClassSubgroupsByStabilizerRep, R 373
- IsConjugacyClassSubgroupsRep, R 373
- IsConjugate, R 361
- IsConjugatorAutomorphism, R 390
- IsConjugatorIsomorphism, R 390
- IsConstantRationalFunction, R 673
- IsConstantTimeAccessGeneralMapping, R 312
- IsConstantTimeAccessList, R 173
- IsContainedInSpan, R 606
- IsCopyable, R 112
- IsCyc, R 158
- IsCyclic, R 366
  - for character tables, R 735
- IsCyclicTom, R 711
- IsCyclotomic, R 158
- IsCyclotomicField, R 593
- IsCyclotomicMatrixGroup, R 432
- IsDenseList, R 172
- IsDiagonalMat, R 226
- IsDictionary, N 9
- IsDigitChar, R 253
- IsDirectoryPath, R 93
- IsDistributive, R 567
- IsDivisionRing, R 577
- IsDomain, R 291
- IsDoneIterator, R 278
- IsDoubleCoset, R 359
- IsDuplicateFree, R 194
- IsDuplicateFreeList, R 194
- IsDxLargeGroup, R 755
- IsElementaryAbelian, R 366
  - for character tables, R 735
- IsElementOfFpMonoid, R 549
- IsElementOfFpSemigroup, R 549
- IsElementOfFreeMagmaRing, R 664
- IsElementOfFreeMagmaRingCollection, R 664
- IsElementOfFreeMagmaRingFamily, R 664
- IsElementOfMagmaRingModuloRelations, R 665
- IsElementOfMagmaRingModuloRelations-Collection, R 665
- IsElementOfMagmaRingModuloRelationsFamily, R 665
- IsElementOfMagmaRingModuloSpanOfZeroFamily, R 666
- IsEmpty, R 272
- IsEmptyString, R 252
- IsEndOfStream, R 100
- IsEndoGeneralMapping, R 312
  - same as IsBinaryRelation, R 314
- IsEqualSet, R 196
- IsEquivalenceClass, R 318
- IsEquivalenceRelation, R 315
- IsEuclideanRing, R 569
- IsEvenInt, R 127
- IsExecutableFile, R 93
- IsExistingFile, R 93
- IsExtAElement, R 299
- IsExternalOrbit, R 409
- IsExternalSet, R 408
- IsExternalSubset, R 409
- IsExtLElement, R 299
- IsExtRElement, R 299
- IsFamilyPcgs, R 453
- IsFFE, R 583
- IsFFECollColl, R 583
- IsFFECollection, R 583
- IsField, R 577
- IsFieldControlledByGaloisGroup, R 580
- IsFieldHomomorphism, R 312
- IsFinite, R 272
  - for character tables, R 735
- IsFiniteDimensional, R 575
  - for matrix algebras, R 622
- IsFiniteFieldPolynomialRing, R 681
- IsFinitelyGeneratedGroup, R 367
- IsFiniteOrderElement, R 301
- IsFiniteOrderElementCollColl, R 301
- IsFiniteOrderElementCollection, R 301
- IsFiniteOrdersPcgs, R 437
- IsFixedStabilizer, R 426
- IsFLMLOR, R 621
- IsFLMLORWithOne, R 621



- IsFpGroup, R 463
- IsFpMonoid, R 549
- IsFpSemigroup, R 549
- IsFreeGroup, R 331
- IsFreeLeftModule, R 575
- IsFreeMagmaRing, R 663
- IsFreeMagmaRingWithOne, R 663
- IsFromFpGroupGeneralMappingByImages, R 395
- IsFromFpGroupHomomorphismByImages, R 395
- IsFromFpGroupStdGensGeneralMappingByImages, R 395
- IsFromFpGroupStdGensHomomorphismByImages, R 395
- IsFullHomModule, R 611
- IsFullMatrixModule, R 576
- IsFullRowModule, R 576
- IsFullSubgroupGLorSLRespectingBilinearForm, R 431
- IsFullSubgroupGLorSLRespectingQuadraticForm, R 432
- IsFullSubgroupGLorSLRespectingSesquilinearForm, R 431
- IsFullTransformationSemigroup, R 540
- IsFunc, T 79
- IsFunction, R 63
- IsGAPRandomSource, R 136
- IsGaussianIntegers, R 597
- IsGaussianRationals, R 592
- IsGaussianSpace, R 606
- IsGaussInt, R 160
- IsGaussRat, R 160
- IsGeneralizedDomain, R 291
- IsGeneralizedRowVector, R 184
- IsGeneralLinearGroup, R 430
- IsGeneralMapping, R 312
- IsGeneralMappingFamily, R 313
- IsGeneratorsOf *Struct*, R 288
- IsGL, R 430
- IsGlobalRandomSource, R 136
- IsGreensClass, R 542
- IsGreensDClass, R 542
- IsGreensDRelation, R 542
- IsGreensHClass, R 542
- IsGreensHRelation, R 542
- IsGreensJClass, R 542
- IsGreensJRelation, R 542
- IsGreensLClass, R 542
- IsGreensLessThanOrEqual, R 542
- IsGreensLRelation, R 542
- IsGreensRClass, R 542
- IsGreensRelation, R 542
- IsGreensRRelation, R 542
- IsGroup, R 350
- IsGroupGeneralMapping, R 310
- IsGroupGeneralMappingByAsGroupGeneralMappingByImages, R 395
- IsGroupGeneralMappingByImages, R 395
- IsGroupGeneralMappingByPcgs, R 395
- IsGroupHClass, R 543
- IsGroupHomomorphism, R 310
- IsGroupOfAutomorphisms, R 391
- IsGroupRing, R 663
- IsHandledByNiceBasis, R 576
  - for vector spaces, R 612
- IsHandledByNiceMonomorphism, R 389
- IsHash, N 10
- IsHasseDiagram, R 315
- IsHomCoset, N 13
- IsHomCosetOfAdditiveElt, N 14
- IsHomCosetOfFp, N 14
- IsHomCosetOfMatrix, N 14
- IsHomCosetOfPerm, N 14
- IsHomCosetOfTuple, N 14
- IsHomCosetToAdditiveElt, N 13
- IsHomCosetToAdditiveEltRep, N 13
- IsHomCosetToFp, N 13
- IsHomCosetToFpRep, N 13
- IsHomCosetToMatrix, N 13
- IsHomCosetToMatrixRep, N 13
- IsHomCosetToObjectRep, N 13
- IsHomCosetToPerm, N 13
- IsHomCosetToPermRep, N 13
- IsHomCosetToTuple, N 13
- IsHomCosetToTupleRep, N 13
- IsHomogeneousList, R 173
- IsIdempotent, R 294
- IsIdenticalObj, R 110, T 24
- IsInChain, N 19
- IsIncomparableUnder, R 281
- IsInducedFromNormalSubgroup, R 826
- IsInducedPcgs, R 440
- IsInducedPcgsWrtSpecialPcgs, R 448
- IsInfBitsFamily, R 337
- IsInfinity, R 160
- IsInjective, R 306
- IsInnerAutomorphism, R 390

- IsInputStream, R 104
- IsInputStream, R 97
- IsInputTextNone, R 97
- IsInputTextStream, R 97
- IsInt, R 127
- IsIntegerMatrixGroup, R 433
- IsIntegers, R 126
- IsIntegralBasis, R 604
- IsIntegralCyclotomic, R 158
- IsIntegralRing, R 566
- IsInternallyConsistent, R 114
  - for character tables, R 744
  - for tables of marks, R 712
- IsIrreducibleCharacter, R 776
- IsIrreducibleRingElement, R 568
- IsIterator, R 278
- IsJacobianElement, R 301
- IsJacobianElementCollColl, R 301
- IsJacobianElementCollection, R 301
- IsJacobianRing, R 567
- IsLaurentPolynomial, R 672
- IsLaurentPolynomialDefaultRep, R 688
- IsLDistributive, R 567
- IsLeftAlgebraModuleElement, R 633
- IsLeftAlgebraModuleElementCollection, R 633
- IsLeftIdeal, R 564
- IsLeftIdealInParent, R 564
- IsLeftModule, R 573
- IsLeftModuleGeneralMapping, R 311
- IsLeftModuleHomomorphism, R 311
- IsLeftOperatorAdditiveGroup, R 573
- IsLeftSemigroupIdeal, R 540
- IsLeftVectorSpace, R 598
- IsLessThanOrEqualUnder, R 281
- IsLessThanUnder, R 281
- IsLetterAssocWordRep, R 336
- IsLetterWordsFamily, R 336
- IsLexicographicallyLess, R 200
- IsLexOrderedFFE, R 584
- IsLieAbelian, R 644
- IsLieAlgebra, R 621
- IsLieMatrix, R 223
- IsLieNilpotent, R 644
- IsLieObject, R 639
- IsLieObjectCollection, R 639
- IsLieSolvable, R 644
- IsLinearMapping, R 311
- IsLinearMappingsModule, R 611
- IsList, R 172
- IsListDefault, R 185
- IsListOrCollection, R 268
- IsLogOrderedFFE, R 584
- IsLookupDictionary, N 9
- IsLowerAlphaChar, R 253
- IsLowerTriangularMat, R 226
- IsMagma, R 319
- IsMagmaHomomorphism, R 309
- IsMagmaRingModuloRelations, R 665
- IsMagmaRingModuloSpanOfZero, R 666
- IsMagmaWithInverses, R 319
- IsMagmaWithInversesIfNonzero, R 319
- IsMagmaWithOne, R 319
- IsMapping, R 305
- IsMat, T 79
- IsMatchingSublist, R 193
- IsMatrix, R 222
- IsMatrixGroup, R 429
- IsMatrixModule, R 576
- IsMatrixSpace, R 606
- IsMersenneTwister, R 136
- IsMinimalNonmonomial, R 829
- IsModuloPcgs, R 442
- IsMonoid, R 545
- IsMonomial, for characters, R 826
  - for character tables, R 735
  - for groups, R 826
  - for positive integers, R 827
- IsMonomialGroup, R 366
- IsMonomialMatrix, R 226
- IsMonomialNumber, R 827
- IsMonomialOrdering, R 682
- IsMultiplicativeElement, R 299
- IsMultiplicativeElementWithInverse, R 300
- IsMultiplicativeElementWithOne, R 300
- IsMultiplicativeElementWithZero, R 300
- IsMultiplicativeGeneralizedRowVector, R 184
- IsMultiplicativeZero, R 323
- IsMutable, R 112
- IsMutableBasis, R 605
- IsNaturalAlternatingGroup, R 416
- IsNaturalGL, R 431
- IsNaturalGLnZ, R 433
- IsNaturalSL, R 431
- IsNaturalSLnZ, R 433
- IsNaturalSymmetricGroup, R 416
- IsNearAdditiveElement, R 299

- IsNearAdditiveElementWithInverse, R 299
- IsNearAdditiveElementWithZero, R 299
- IsNearAdditiveGroup, R 557
- IsNearAdditiveMagma, R 557
- IsNearAdditiveMagmaWithInverses, R 557
- IsNearAdditiveMagmaWithZero, R 557
- IsNearlyCharacterTable, R 729
- IsNearRingElement, R 300
- IsNearRingElementWithInverse, R 300
- IsNearRingElementWithOne, R 300
- IsNegRat, R 146
- IsNilpotent, for character tables, R 735
  - for groups with pcgs, R 450
- IsNilpotentElement, R 651
- IsNilpotentGroup, R 366
- IsNilpotentTom, R 711
- IsNonassocWord, R 326
- IsNonassocWordCollection, R 326
- IsNonassocWordWithOne, R 326
- IsNonassocWordWithOneCollection, R 326
- IsNonnegativeIntegers, R 126
- IsNonSPGeneralMapping, R 313
- IsNonTrivial, R 272
- IsNormal, R 351
- IsNormalBasis, R 604
- IsNotIdenticalObj, R 111
- IsNumberField, R 593
- IsObject, R 109
- IsOddInt, R 127
- isomorphic, pc group, R 456
- IsomorphicSubgroups, R 393
- IsomorphismFpAlgebra, R 630
- IsomorphismFpGroup, R 472
  - for subgroups of fp groups, R 474
- IsomorphismFpGroupByGenerators, R 472
- IsomorphismFpGroupByGeneratorsNC, R 472
- IsomorphismFpGroupByPcgs, R 454
- IsomorphismFpSemigroup, R 550
- IsomorphismGroups, R 393
- IsomorphismMatrixAlgebra, R 630
- IsomorphismPcGroup, R 457
- IsomorphismPermGroup, R 416
  - for Imf matrix groups, R 536
- IsomorphismPermGroupImfGroup, R 537
- IsomorphismReesMatrixSemigroup, R 544
- IsomorphismRefinedPcGroup, R 456
- IsomorphismRepStruct, R 289
- isomorphisms, find all, R 393
- IsomorphismSCAlgebra, R 631
- IsomorphismSimplifiedFpGroup, R 475
- IsomorphismSpecialPcGroup, R 457
- Isomorphisms vs. Isomorphic Structures, *T* 84
- IsomorphismTransformationSemigroup, R 540
- IsomorphismTypeInfoFiniteSimpleGroup, R 367
- IsOne, R 294
- IsOperation, R 63
- IsOrdering, R 280
- IsOrderingOnFamilyOfAssocWords, R 282
- IsOrdinaryMatrix, R 222
- IsOrdinaryTable, R 729
- IsOutputStream, R 97
- IsOutputTextNone, R 98
- IsOutputTextStream, R 98
- IsPadicExtensionNumber, R 695
- IsPadicExtensionNumberFamily, R 695
- IsParentPcgsFamilyPcgs, R 453
- IsPartialOrderBinaryRelation, R 315
- IsPcGroup, R 454
- IsPcGroupGeneralMappingByImages, R 395
- IsPcGroupHomomorphismByImages, R 395
- IsPcgs, R 436
- IsPcgsCentralSeries, R 444
- IsPcgsChiefSeries, R 445
- IsPcgsElementaryAbelianSeries, R 444
- IsPcgsPCentralSeriesPGroup, R 445
- IsPerfect, for character tables, R 735
- IsPerfectGroup, R 366
- IsPerfectTom, R 711
- IsPerm, R 411
- IsPermCollColl, R 411
- IsPermCollection, R 411
- IsPermGroup, R 415
- IsPermGroupGeneralMappingByImages, R 395
- IsPermGroupHomomorphismByImages, R 395
- IsPGroup, R 367
- IsPNilpotent, R 368
- IsPolycyclicGroup, R 366
- IsPolynomial, R 672
- IsPolynomialDefaultRep, R 688
- IsPolynomialFunction, R 671
- IsPolynomialFunctionsFamily, R 686
- IsPolynomialRing, R 681
- IsPosInt, R 127
- IsPositiveIntegers, R 126
- IsPosRat, R 146

- IsPreimagesByAsGroupGeneralMappingByImages, R 395
- IsPreOrderBinaryRelation, R 315
- IsPrime, R 568
- IsPrimeField, R 579
- IsPrimeInt, R 131
- IsPrimeOrdersPcgs, R 437
- IsPrimePowerInt, R 132
- IsPrimitive, R 407
- IsPrimitiveCharacter, R 825
- IsPrimitivePolynomial, R 673
- IsPrimitiveRootMod, R 140
- IsProbablyPrimeInt, R 131
- IsPseudoCanonicalBasisFullHomModule, R 611
- IsPSolvable, R 368
- IsPSolvableCharacterTable, R 745
- IsPSolvableCharacterTableOp, R 745
- IsPurePadicNumber, R 694
- IsPurePadicNumberFamily, R 694
- IsQuasiPrimitive, R 825
- IsQuaternion, R 622
- IsQuaternionCollColl, R 622
- IsQuaternionCollection, R 622
- IsQuickPositionList, R 208
- IsQuotientSemigroup, R 541
- IsRandomSource, R 136
- IsRange, R 207
- IsRat, R 145
- IsRationalFunction, R 671
- IsRationalFunctionDefaultRep, R 688
- IsRationalFunctionsFamily, R 686
- IsRationalMatrixGroup, R 432
- IsRationals, R 145
- IsRationalsPolynomialRing, R 681
- IsRDistributive, R 567
- IsReadableFile, R 93
- IsReadOnlyGlobal, R 44
- IsRec, T 79
- IsRecord, R 261
- IsRecordCollColl, R 261
- IsRecordCollection, R 261
- IsReduced, R 345
- IsReductionOrdering, R 282
- IsReesCongruence, R 541
- IsReesCongruenceSemigroup, R 540
- IsReesMatrixSemigroup, R 543
- IsReesMatrixSemigroupElement, R 544
- IsReesZeroMatrixSemigroup, R 543
- IsReesZeroMatrixSemigroupElement, R 544
- IsReflexiveBinaryRelation, R 314
- IsRegular, R 406
- IsRegularDClass, R 543
- IsRegularSemigroup, R 539
- IsRegularSemigroupElement, R 539
- IsRelativelySM, R 828
- IsRestrictedLieAlgebra, R 649
- IsRewritingSystem, R 344
- IsRightAlgebraModuleElement, R 633
- IsRightAlgebraModuleElementCollection, R 633
- IsRightCoset, R 357
- IsRightIdeal, R 564
- IsRightIdealInParent, R 564
- IsRightModule, R 574
- IsRightOperatorAdditiveGroup, R 573
- IsRightSemigroupIdeal, R 540
- IsRing, R 561
- IsRingElement, R 300
- IsRingElementWithInverse, R 300
- IsRingElementWithOne, R 300
- IsRingGeneralMapping, R 312
- IsRingHomomorphism, R 312
- IsRingWithOne, R 565
- IsRingWithOneGeneralMapping, R 312
- IsRingWithOneHomomorphism, R 312
- IsRootSystem, R 646
- IsRootSystemFromLieAlgebra, R 646
- IsRowModule, R 576
- IsRowSpace, R 606
- IsRowVector, R 214
- IsScalar, R 300
- IsSemiEchelonized, R 607
- IsSemigroup, R 538
- IsSemigroupCongruence, R 541
- IsSemigroupIdeal, R 540
- IsSemiRegular, R 406
- IsSet, R 194, T 79
- IsShortLexLessThanOrEqual, R 333
- IsShortLexOrdering, R 283
- IsSimple, for character tables, R 735
- IsSimpleAlgebra, R 622
- IsSimpleGroup, R 366
- IsSimpleSemigroup, R 539
- IsSingleValued, R 305
- IsSL, R 431
- IsSolvable, for character tables, R 735
- IsSolvableGroup, R 366

- IsSolvableTom, R 711
- IsSortedList, R 194
- IsSpecialLinearGroup, R 431
- IsSpecialPcgs, R 447
- IsSPGeneralMapping, R 313
- IsSporadicSimple, for character tables, R 735
- IsSSortedList, R 194
- IsStandardGeneratorsOfGroup, R 717
- IsStraightLineProgElm, R 342
- IsStraightLineProgram, R 338
- IsStream, R 97
- IsString, R 249
- IsStringRep, R 252
- IsStruct, R 289
- IsSubgroup, R 351
- IsSubgroupFpGroup, R 463
- IsSubgroupOfWholeGroupByQuotientRep, R 476
- IsSubgroupSL, R 431
- IsSubmonoidFpMonoid, R 548
- IsSubnormal, R 352
- IsSubnormallyMonomial, R 828
- IsSubsemigroupFpSemigroup, R 548
- IsSubset, R 274
- IsSubsetBlist, R 211
- IsSubsetLocallyFiniteGroup, R 367
- IsSubsetSet, R 197
- IsSubspacesVectorSpace, R 600
- IsSubstruct, R 291
- IsSupersolvable, for character tables, R 735
  - for groups with pcgs, R 450
- IsSupersolvableGroup, R 366
- IsSurjective, R 306
- IsSyllableAssocWordRep, R 337
- IsSyllableWordsFamily, R 337
- IsSymmetricBinaryRelation, R 315
- IsSymmetricGroup, R 417
- IsTable, R 173
- IsTableOfMarks, R 707
- IsTableOfMarksWithGens, R 718
- IsToPcGroupGeneralMappingByImages, R 395
- IsToPcGroupHomomorphismByImages, R 395
- IsToPermGroupGeneralMappingByImages, R 395
- IsToPermGroupHomomorphismByImages, R 395
- IsTotal, R 305
- IsTotalOrdering, R 281
- IsTransformation, R 554
- IsTransformationCollection, R 554
- IsTransformationMonoid, R 540
- IsTransformationSemigroup, R 540
- IsTransitive, for characters, R 779
  - for class functions, R 779
  - for group actions, R 406
- IsTransitiveBinaryRelation, R 315
- IsTranslationInvariantOrdering, R 282
- IsTrivial, R 272
- IsTuple, R 303
- IsTwoSidedIdeal, R 564
- IsTwoSidedIdealInParent, R 564
- IsUEALatticeElement, R 658
- IsUEALatticeElementCollection, R 658
- IsUEALatticeElementFamily, R 658
- IsUniqueFactorizationRing, R 566
- IsUnit, R 567
- IsUnivariatePolynomial, R 672
- IsUnivariatePolynomialRing, R 682
- IsUnivariateRationalFunction, R 672
- IsUnknown, R 167
- IsUpperAlphaChar, R 253
- IsUpperTriangularMat, R 226
- IsValidIdentifier, R 42
- IsVector, R 300
- IsVectorSpace, R 598
- IsVirtualCharacter, R 776
- IsWeightLexOrdering, R 284
- IsWeightRepElement, R 659
- IsWeightRepElementCollection, R 659
- IsWeightRepElementFamily, R 659
- IsWellFoundedOrdering, R 281
- IsWeylGroup, R 647
- IsWholeFamily, R 273
- IsWLetterAssocWordRep, R 337
- IsWLetterWordsFamily, R 337
- IsWord, R 325
- IsWordCollection, R 326
- IsWordWithInverse, R 325
- IsWordWithOne, R 325
- IsWreathProductOrdering, R 285
- IsWritableFile, R 93
- IsZero, R 294
- IsZeroGroup, R 540
- IsZeroSimpleSemigroup, R 539
- IsZeroSquaredElement, R 302
- IsZeroSquaredElementCollColl, R 302
- IsZeroSquaredElementCollection, R 302
- IsZeroSquaredRing, R 567
- IsZmodnZObj, R 135

IsZmodnZObjNonprime, R 135  
 IsZmodpZObj, R 135  
 IsZmodpZObjLarge, R 135  
 IsZmodpZObjSmall, R 135  
 Iterated, R 205  
 Iterator, R 277  
 iterator, for low index subgroups, R 471  
 IteratorByBasis, R 603  
 IteratorByFunctions, R 279  
 IteratorList, R 279  
 Iterators, *R 277*  
 IteratorSorted, R 278

## J

$j_N$ , R 162  
 Jacobi, R 140  
 JenningsLieAlgebra, R 650  
 JenningsSeries, R 371  
 JoinEquivalenceRelations, R 317  
 JoinStringsWithSeparator, R 256  
 JordanDecomposition, R 235

## K

$k_N$ , R 162  
 KappaPerp, R 651  
 KB\_REW, R 552  
 kernel, T 55  
 KernelOfAdditiveGeneralMapping, R 311  
 KernelOfCharacter, R 778  
 KernelOfMultiplicativeGeneralMapping, R 310  
 KernelOfTransformation, R 555  
 KeyDependentOperation, E 46  
 Key Dependent Operations, *E 46*  
 Keywords, *R 41*  
 KillingMatrix, R 651  
 KnownAttributesOfObject, R 121, T 75  
 Known Problems of the Configure Process, *R 837*  
 KnownPropertiesOfObject, R 124, T 75  
 KnownTruePropertiesOfObject, R 124, T 75  
 KnowsDictionary, N 9  
 KnowsHowToDecompose, R 383  
 KnuthBendixRewritingSystem, R 553  
 Krasner-Kaloujnine theorem, R 508  
 KroneckerProduct, R 228  
 KuKGenerators, R 508

## L

$l_N$ , R 162  
 Labels and References, *E 15*

Lambda, R 138  
 Language Overview, *R 39*  
 larger or equal, R 47  
 larger test, R 47  
 LargestElementGroup, R 379  
 LargestElementStabChain, R 424  
 LargestMovedPoint, R 412  
 LargestUnknown, R 167  
 last, R 64, T 24  
 last2, T 24  
 last3, T 24  
 LastSystemError, R 90  
 LaTeXStringDecompositionMatrix, R 743  
 lattice base reduction, R 246  
 lattice basis reduction, for virtual characters, R 783  
 LatticeByCyclicExtension, R 376  
 LatticeGeneratorsInUEA, R 658  
 Lattice Reduction, *R 245*  
 LatticeSubgroups, R 374  
 LatticeSubgroupsByTom, R 705  
 LaurentPolynomialByCoefficients, R 679  
 LaurentPolynomialByExtRep, R 689  
 LaurentPolynomialByExtRepNC, R 689  
 Laurent Polynomials, *R 679*  
 LClassOfHClass, R 542  
 Lcm, R 571  
 LcmInt, R 130  
 LcmOp, R 571  
 LeadCoeffsIGS, R 441  
 LeadingCoefficient, R 674  
 LeadingCoefficientOfPolynomial, R 683  
 LeadingExponentOfPcElement, R 438  
 LeadingMonomial, R 675  
 LeadingMonomialOfPolynomial, R 682  
 LeadingTermOfPolynomial, R 682  
 Leaving GAP, *R 73*  
 leaving GAP, T 18  
 LeftActingAlgebra, R 634  
 LeftActingDomain, R 574  
 LeftActingRingOfIdeal, R 565  
 LeftAlgebraModule, R 632  
 LeftAlgebraModuleByGenerators, R 632  
 left cosets, R 357  
 LeftDerivations, R 641  
 LeftIdeal, R 563  
 LeftIdealByGenerators, R 564  
 LeftIdealNC, R 564  
 LeftModuleByGenerators, R 574

- LeftModuleByHomomorphismToMatAlg, R 635
- LeftModuleGeneralMappingByImages, R 609
- LeftModuleHomomorphismByImages, R 609
- LeftModuleHomomorphismByImagesNC, R 609
- LeftModuleHomomorphismByMatrix, R 610
- LeftQuotient, R 296
  - for words, R 334
- LeftShiftRowVector, R 218
- legacy, R 849
- Legendre, R 141
- Length, R 194
  - of an associative word, R 334
- length, of a word, R 334
- LengthsTom, R 708
- LengthWord, T 79
- LengthWPObj, E 52
- LenstraBase, R 595
- LessThanFunction, R 281
- LessThanOrEqualFunction, R 281
- LetterRepAssocWord, R 337
- LevelsOfGenerators, R 285
- LeviMalcevDecomposition, R 627
  - for Lie algebras, R 645
- Lexical Structure, R 40
- LexicographicOrdering, R 282
- LGFirst, R 448
- LGLayers, R 448
- LGLength, R 448
- LGWeights, R 447
- library tables, R 726
- LieAlgebra, R 640
- LieAlgebraByStructureConstants, R 640
- LieBracket, R 296
- LieCenter, R 642
- LieCentralizer, R 642
- LieCentre, R 642
- LieCoboundaryOperator, R 655
- LieDerivedSeries, R 643
- LieDerivedSubalgebra, R 643
- LieFamily, R 640
- LieLowerCentralSeries, R 644
- LieNilRadical, R 643
- LieNormalizer, R 642
- LieObject, R 639
- Lie objects, R 639
- LieSolvableRadical, R 643
- LieUpperCentralSeries, R 644
- LiftedInducedPcgs, R 443
- LiftedPcElement, R 443
- LinearAction, R 449
- LinearActionLayer, R 449
- LinearCharacters, R 735
- LinearCombination, R 603
- LinearCombinationPcgs, R 438
- Linear equations over the integers and Integral Matrices, R 240
- LinearIndependentColumns, R 245
- Linear Mappings, R 311
- LinearOperation, R 449
- LinearOperationLayer, R 449
- Line Editing, R 74
- line editing, T 20
- LinesOfStraightLineProgram, R 339
- List, R 202
- list and non-list, difference, R 187
  - left quotient, R 189
  - mod, R 189
  - product, R 188
  - quotient, R 189
- List Assignment, R 176
- list assignment, operation, R 174
- ListBlist, R 211
- list boundedness test, operation, R 174
- List Categories, R 172
- list element, access, R 174
  - assignment, R 176
  - operation, R 174
- List Elements, R 174
- list environment, compact description, E 21
  - description, E 20
  - ordered, E 21
  - unordered, E 21
- list equal, comparison, R 183
- ListN, R 205
- list of available books, R 23
- List Operations, T 35
- ListPerm, R 414
- lists, dense, T 29
  - strictly sorted, T 31
- lists, identical, T 29
  - plain, T 27
- Lists and Collections, R 268
- list smaller, comparison, R 183
- ListStabChain, R 424
- list unbind, operation, R 174
- ListWithIdenticalEntries, R 190

- ListX, R 205
- LLL, R 783
- LLL algorithm, for Gram matrices, R 246
  - for vectors, R 245
  - for virtual characters, R 783
- LLLReducedBasis, R 245
- LLLReducedGramMat, R 246
- LoadDynamicModule, R 35
- Loading a GAP Package, *R 845*
- loading a saved workspace, R 37
- loading source code from a file, T 19
- LoadPackage, R 845
- local, R 55
- Local Variables, *T 41*
- logarithm, discrete, R 140
  - of a root of unity, R 160
- LogFFE, R 585
- logical, R 169
- Logical Implications, *P 14*
- logical operations, R 170
- LogInt, R 128
- LogMod, R 139
- LogModShanks, R 139
- LogTo, R 95
  - for streams, R 101
  - stop logging, R 95
- LongestWeylWordPerm, R 648
- LookupDictionary, N 9
- loop, read eval print, R 64
- loop, for, R 53
  - repeat, R 52
  - while, R 52
- loop over iterator, R 54
- loop over object, R 54
- loop over range, R 53
- loops, leaving, R 55
  - restarting, R 55
- loops, for, *T 33*
  - while, *T 33*
- LowercaseString, R 254
- LowerCentralSeriesOfGroup, R 370
- Low Index Subgroups, *R 471*
- LowIndexSubgroupsFpGroup, R 471
- LowIndexSubgroupsFpGroupIterator, R 471
- Low Level Access Functions for Weak Pointer Objects, *E 52*
- Low Level Routines to Modify and Create Stabilizer Chains, *R 425*
- Lucas, R 155
- M**
  - $m_N$ , R 162
  - Macintosh, R 840
  - MacOS, R 841
  - Magma, R 320
  - MagmaByGenerators, R 320
  - MagmaByMultiplicationTable, R 321
  - Magma Categories, *R 319*
  - MagmaElement, R 321
  - Magma Generation, *R 320*
  - MagmaHomomorphismByFunctionNC, R 309
  - Magma Homomorphisms, *R 309*
  - MagmaRingModuloSpanOfZero, R 666
  - Magma Rings modulo Relations, *R 665*
  - Magma Rings modulo the Span of a Zero Element, *R 666*
  - Magmas Defined by Multiplication Tables, *R 321*
  - MagmaWithInverses, R 320
  - MagmaWithInversesByGenerators, R 320
  - MagmaWithInversesByMultiplicationTable, R 321
  - MagmaWithOne, R 320
  - MagmaWithOneByGenerators, R 320
  - MagmaWithOneByMultiplicationTable, R 321
  - Main Loop, *R 64*
  - MakeConfluent, R 345
  - MakeHomChain, N 21
  - MakeImmutable, R 112
  - makeindex, E 26
  - MakeReadOnlyGlobal, R 44
  - MakeReadWriteGlobal, R 44
  - Making transformation semigroups, *R 540*
  - manual.bb1, E 26
  - manual.bib, E 26
  - manual.dvi, E 26
  - manual.lab, E 26
  - manual.mst, E 26
  - manual.six, E 26
  - manual.tex, E 26
  - Manual Conventions, *R 20*
  - manualindex, E 26
  - map, parametrized, R 810
  - MappedWord, R 327
  - MappingByFunction, R 304
  - MappingPermListList, R 414
  - Mappings that Respect Addition, *R 311*



- Mappings that Respect Multiplication, *R 310*
- Mappings which are Compatible with Algebraic Structures, *R 309*
- maps, *R 801*
- maps-to operator, *T 25*
- MarksTom, *R 708*
- MatAlgebra, *R 618*
- MatClassMultCoeffsCharTable, *R 747*
- mathematics alignments, *E 23*
- mathematics displays, *E 23*
- MathieuGroup, *R 512*
- MatLieAlgebra, *R 641*
- matrices, *T 36*
  - commutator, *R 225*
- Matrices as Basis of a Row Space, *R 233*
- Matrices as Linear Mappings, *R 234*
- Matrices over Finite Fields, *R 236*
- Matrices Representing Linear Equations and the Gaussian Algorithm, *R 229*
- MatrixAlgebra, *R 618*
- MatrixAutomorphisms, *R 763*
- matrix automorphisms, *R 804*
- MatrixByBlockMatrix, *R 239*
- Matrix Constructions, *R 227*
- Matrix Groups in Characteristic 0, *R 432*
- MatrixLieAlgebra, *R 641*
- MatrixOfAction, *R 634*
- matrix spaces, *R 606*
- MatScalarProducts, *R 777*
- MatTom, *R 710*
- MaximalAbelianQuotient, *R 372*
- MaximalBlocks, *R 407*
- MaximalNormalSubgroups, *R 374*
- MaximalSubgroupClassReps, *R 373*
- MaximalSubgroups, *R 373*
  - for groups with pcgs, *R 450*
- MaximalSubgroupsLattice, *R 375*
- MaximalSubgroupsTom, *R 714*
- Maximum, *R 200*
- MaximumList, *R 201*
- MeatAxe Modules, *R 696*
- MeetEquivalenceRelations, *R 317*
- MeetMaps, *R 813*
- MeetPartitionStrat, *E 59*
- meet strategy, *E 59*
- Membership Test for Collections, *R 276*
- Membership Test for Lists, *R 182*
- MemoryUsage, *R 114*
- method, *P 11*
- Method Installation, *P 11*
- methods, *T 72*
  - immediate, *T 74*
  - selection, *T 73*
  - true, *T 74*
- MinimalElementCosetStabChain, *R 424*
- MinimalGeneratingSet, *R 379*
  - for groups with pcgs, *R 450*
- MinimalNonmonomialGroup, *R 829*
- Minimal Nonmonomial Groups, *R 829*
- MinimalNormalSubgroups, *R 374*
- MinimalPolynomial, *R 676*
  - over a field, *R 580*
  - over a ring, *R 676*
- Minimal Polynomials, *R 676*
- MinimalStabChain, *R 422*
- MinimalSupergroupsLattice, *R 375*
- MinimalSupergroupsTom, *R 715*
- MinimizedBombieriNorm, *R 678*
- Minimum, *R 200*
- MinimumList, *R 201*
- MinusCharacter, *R 819*
- Miscellaneous, *R 144*
- Miscellaneous Name Changes or Removed Names, *R 850*
- mod, integers, *R 135*
  - laurent polynomials, *R 670*
  - lists, *R 189*
  - rationals, *R 48*
- mod, *R 48*
  - arithmetic operators, *R 48*
  - for character tables, *R 733*
  - residue class rings, *R 134*
- modular inverse, *R 48*
- modular remainder, *R 48*
- modular roots, *R 142*
- ModuleByRestriction, *R 636*
- Module Constructions, *R 696*
- Module Homomorphisms, *R 699*
- ModuleOfExtension, *R 459*
- Modules over Lie Algebras and Their Cohomology, *R 654*
- Modules over Semisimple Lie Algebras, *R 656*
- modulo, *R 48*
  - arithmetic operators, *R 48*
  - for pcgs, *R 442*
  - residue class rings, *R 134*

- ModuloPcgs, R 442
- MoebiusMu, R 143
- MoebiusTom, R 710
- Molien Series, *R 790*
- MolienSeries, R 790
- MolienSeriesInfo, R 791
- MolienSeriesWithGivenDenominator, R 792
- Monoid, R 545
- MonoidByGenerators, R 545
- MonoidByMultiplicationTable, R 546
- MonoidOfRewritingSystem, R 553
- MonomialComparisonFunction, R 683
- MonomialExtGrlexLess, R 685
- MonomialExtrepComparisonFun, R 683
- MonomialGrevlexOrdering, R 684
- MonomialGrlexOrdering, R 684
- MonomialLexOrdering, R 683
- Monomial Orderings, *R 682*
- MonomialTotalDegreeLess, R 850
- monomorphisms, find all, R 393
- MorClassLoop, R 393
- More about Boolean Lists, *R 213*
- More About Global Variables, *R 44*
- More about Tables of Marks, *R 702*
- MostFrequentGeneratorFpGroup, R 469
- MovedPoints, R 413
- Moved Points of Permutations, *R 412*
- MTX.BasesCompositionSeries, R 698
- MTX.BasesMaximalSubmodules, R 698
- MTX.BasesMinimalSubmodules, R 697
- MTX.BasesMinimalSupermodules, R 698
- MTX.BasesSubmodules, R 697
- MTX.BasisInOrbit, R 699
- MTX.BasisRadical, R 698
- MTX.BasisSocle, R 698
- MTX.CollectedExceptions, R 698
- MTX.CompositionFactors, R 698
- MTX.DegreeSplittingField, R 697
- MTX.Dimension, R 697
- MTX.Distinguish, R 699
- MTX.Field, R 697
- MTX.Generators, R 697
- MTX.Homomorphism, R 699
- MTX.Homomorphisms, R 699
- MTX.InducedAction, R 698
- MTX.InducedActionFactorMatrix, R 698
- MTX.InducedActionFactorModule, R 698
- MTX.InducedActionMatrix, R 698
- MTX.InducedActionMatrixNB, R 698
- MTX.InducedActionSubmodule, R 698
- MTX.InducedActionSubmoduleNB, R 698
- MTX.InvariantBilinearForm, R 699
- MTX.InvariantQuadraticForm, R 699
- MTX.InvariantSesquilinearForm, R 699
- MTX.IsAbsolutelyIrreducible, R 697
- MTX.IsEquivalent, R 699
- MTX.IsIrreducible, R 697
- MTX.Isomorphism, R 699
- MTX.NormedBasisAndBaseChange, R 698
- MTX.OrthogonalSign, R 699
- MTX.ProperSubmoduleBasis, R 697
- MTX.SubGModule, R 697
- MTX.SubmoduleGModule, R 697
- multiplication, R 48
  - matrices, R 224
  - matrix and matrix list, R 225
  - matrix and scalar, R 223
  - matrix and vector, R 224
  - operation, R 296
  - scalar and matrix, R 223
  - scalar and matrix list, R 225
  - scalar and vector, R 215
  - vector and matrix, R 224
  - vector and matrix list, R 225
  - vector and scalar, R 215
  - vectors, R 215
- MultiplicationTable, R 321
- Multiplicative Arithmetic for Lists, *R 187*
- Multiplicative Arithmetic Functions, *R 142*
- MultiplicativeNeutralElement, R 323
- multiplicative order of an integer, R 139
- MultiplicativeZero, R 323
- MultiplicativeZeroOp, R 293
- multiplicity, of constituents of a group character, R 777
- multiplier, R 382
- multisets, R 196
- Multivariate Polynomials, *R 676*
- MultRowVector, R 218
- Murnaghan components, R 790
- Mutability and Copyability, *R 111*
- Mutability and Copying, *P 29*
- Mutability Status and List Arithmetic, *R 189*
- Mutable Bases, *R 605*
- MutableBasis, R 605
- MutableBasisOfClosureUnderAction, R 624

- MutableBasisOfIdealInNonassociativeAlgebra, R 625
- MutableBasisOfNonassociativeAlgebra, R 625
- MutableCopyMat, R 228
- MutableIdentityMat, R 228
- MutableNullMat, R 228
- N**
- $n_k$ , R 163
- Name, R 114
- NameFunction, R 61
- NameRNam, R 266
- NamesFilter, R 118
- NamesGVars, R 45
- NamesLocalVariablesFunction, R 61
- NamesOfComponents, P 21
- NamesOfFusionSources, R 808
- NamesSystemGVars, R 45
- NamesUserGVars, R 45
- Naming Conventions, *T 79*
- NaturalCharacter, R 775
- Natural Embeddings related to Magma Rings, *R 664*
- NaturalHomomorphismByGenerators, R 309
- NaturalHomomorphismByIdeal, R 630
- NaturalHomomorphismByNormalSubgroup, R 372
- NaturalHomomorphismByNormalSubgroupNC, R 372
- NaturalHomomorphismBySubAlgebraModule, R 637
- NaturalHomomorphismBySubspace, R 610
- NearAdditiveGroup, R 558
- NearAdditiveGroupByGenerators, R 558
- NearAdditiveMagma, R 558
- NearAdditiveMagmaByGenerators, R 558
- NearAdditiveMagmaWithZero, R 558
- NearAdditiveMagmaWithZeroByGenerators, R 558
- NearlyCharacterTablesFamily, R 730
- negative number, R 48
- NegativeRoots, R 646
- NegativeRootVectors, R 646
- NestingDepthA, R 185
- NestingDepthM, R 185
- New Arithmetic Operations vs. New Objects, *P 64*
- NewAttribute, P 17
  - example, P 38
  - mutable, P 17
- NewCategory, P 16
- NewDictionary, N 9
- NewFamily, P 19
- NewFilter, P 18
- NewInfoClass, R 80
- newline, R 41
- newline character, R 251
- NewmanInfinityCriterion, R 479
- NewOperation, P 18
- New Presentations and Presentations for Subgroups, *R 474*
- NewProperty, P 17
- NewRepresentation, P 17
  - example, P 39
- NewType, P 20
- NextIterator, R 278
- NextPrimeInt, R 132
- NF, R 592
- NiceBasis, R 612
- NiceBasisFiltersInfo, R 613
- NiceFreeLeftModule, R 612
- NiceFreeLeftModuleInfo, R 612
- NiceMonomorphism, R 389
- NiceMonomorphismAutomGroup, R 392
- Nice Monomorphisms, *R 389, T 56*
- NiceObject, R 389
- NiceVector, R 612
- NilpotencyClassOfGroup, R 366
- NilpotentQuotientOfFpLieAlgebra, R 653
- NK, R 163
- NOAUTO, R 846
- NOfCyc, T 79
- NonabelianExteriorSquare, R 382
- NonnegativeIntegers, R 126
- NonnegIntScalarProducts, R 816
- NonNilpotentElement, R 651
- Norm, R 580
  - of character, R 777
- NormalBase, R 582
- NormalClosure, R 362
- NormalFormIntMat, R 243
- Normal Forms of Integer Matrices - Name Changes, *R 850*
- Normal Forms over the Integers, *R 241*
- NormalIntersection, R 362
- NormalizedElementOfMagmaRingModulo-Relations, R 665
- NormalizedWhitespace, R 255
- Normalizer, R 361
- normalizer, R 361
- NormalizerInGLnZ, R 433
- NormalizerInGLnZBravaisGroup, R 433

- NormalizersTom, R 712
  - NormalizerTom, R 712
  - NormalizeWhitespace, R 255
  - NormalSeriesByPcgs, R 446
  - Normal Structure, *R 361*
  - NormalSubgroupClasses, R 765
  - NormalSubgroupClassesInfo, R 765
  - NormalSubgroups, R 374
  - NormedRowVector, R 216
  - NormedRowVectors, R 609
  - NormedVectors, R 850
  - not, R 171
  - Notions of Generation, *T 69*
  - NrArrangements, R 150
  - NrBasisVectors, R 605
  - NrCombinations, R 149
  - NrConjugacyClasses, R 360
    - for character tables, R 735
  - NrConjugacyClassesGL, R 516
  - NrConjugacyClassesGU, R 516
  - NrConjugacyClassesPGL, R 516
  - NrConjugacyClassesPGU, R 516
  - NrConjugacyClassesPSL, R 516
  - NrConjugacyClassesPSU, R 516
  - NrConjugacyClassesSL, R 516
  - NrConjugacyClassesSLIsogeneous, R 516
  - NrConjugacyClassesSU, R 516
  - NrConjugacyClassesSUIsogeneous, R 516
  - NrDerangements, R 152
  - NrInputsOfStraightLineProgram, R 339
  - NrMovedPoints, R 413
  - NrOrderedPartitions, R 154
  - NrPartitions, R 153
  - NrPartitionsSet, R 152
  - NrPartitionTuples, R 155
  - NrPermutationsList, R 151
  - NrPolyhedralSubgroups, R 746
  - NrPrimitiveGroups, R 527
  - NrRestrictedPartitions, R 154
  - NrSubsTom, R 708
  - NrTransitiveGroups, R 518
  - NrTuples, R 151
  - NrUnorderedTuples, R 150
  - NullAlgebra, R 619
  - NullMat, R 227
  - NullspaceIntMat, R 240
  - NullspaceMat, R 229
  - NullspaceMatDestructive, R 229
  - NullspaceModQ, R 238
  - Number, R 202
  - number, Bell, R 148
    - binomial, R 147
    - Stirling, of the first kind, R 148
    - Stirling, of the second kind, R 149
  - NumberArgumentsFunction, R 61
  - NumberFFVector, R 217
  - number field, R 593
  - number fields, Galois group, R 596
  - NumberIrreducibleSolvableGroups, R 529
  - NumberPerfectGroups, R 523
  - NumberPerfectLibraryGroups, R 523
  - NumberSmallGroups, R 520
  - NumberSyllables, R 335
  - Numerator, T 79
  - numerator, of a rational, R 146
  - NumeratorOfModuloPcgs, R 442
  - NumeratorOfRationalFunction, R 671
  - NumeratorRat, R 146
  - Numerical Group Attributes, *R 368*
- O**
- O, Operation mark-up, E 16
  - $O_p(G)$ , see PCore, R 361
  - ObjByExtRep, P 29, R 658
  - Objectify, P 20
  - ObjectifyWithAttributes, P 20
  - Objects, *R 109*
  - objects, T 22
  - objects, vs. elements, *T 24*
    - vs. variables, *T 22*
  - obsolete, R 849
  - OCOneCocycles, R 381
  - octal character codes, R 251
  - OctaveAlgebra, R 618
  - od, R 53
  - OldGeneratorsOfPresentation, R 497
  - Omega, R 365
  - ONanScottType, R 417
  - OnBreak, R 68
  - OnBreakMessage, R 70
  - One, N 17, R 292
  - OneAttr, R 292
  - OneCoboundaries, R 380
  - OneCocycles, R 380
  - one cohomology, R 379
  - OneFactorBound, R 678

- OneImmutable, R 292
- OneIrreducibleSolvableGroup, R 529
- OneLibraryGroup, R 518
- OneMutable, R 292
- OneOfPcgs, R 437
- OneOp, R 292
- OnePrimitiveGroup, R 518
- OneSameMutability, R 292
- OneSM, R 292
- OneSmallGroup, R 520
- OneTransitiveGroup, R 518
- OnIndeterminates, R 676
  - as a permutation action, R 398
- OnLeftInverse, R 397
- OnLines, R 398
  - example, R 513
- OnPairs, R 397
- OnPoints, R 397
- OnRight, R 397
- OnSets, R 397
- OnSetsDisjointSets, R 398
- OnSetsSets, R 397
- OnSetsTuples, R 398
- OnSubspacesByCanonicalBasis, R 399
- OnTuples, R 397
- OnTuplesSets, R 398
- OnTuplesTuples, R 398
- Operation, R 849
- operation, P 11
- OperationAlgebraHomomorphism, R 630
- Operational Structure of Domains, R 286
- Operation Functions, E 48
- OperationHomomorphism, R 849
- operations, T 75
  - for booleans, R 170
- Operations and Attributes for Vector Spaces, R 599
- Operations and Mathematical Terms, P 14
- Operations and Methods, P 11
- Operations applicable to All Streams, R 98
- Operations Concerning Blocks, R 741
- Operations for (Near-)Additive Magmas, R 560
- Operations for Abelian Number Fields, R 592
- operations for algebraic elements, R 691
- Operations for Associative Words, R 334
- Operations for Associative Words by their Syllables, R 335
- Operations for Booleans, R 170
- Operations for Brauer Characters, R 799
- Operations for Class Functions, R 776
- Operations for Collections, R 274
- Operations for Cyclotomics, R 157
- Operations for Domains, R 291
- Operations for Finite Field Elements, R 585
- Operations for Finitely Presented Groups, R 465
- Operations for Group Homomorphisms, R 386
- Operations for Input Streams, R 98
- Operations for Lists, R 198
- Operations for Output Streams, R 101
- Operations for Pc Groups, R 457
- Operations for Rational Functions, R 670
- Operations for Special Kinds of Bases, R 604
- Operations for Stabilizer Chains, R 423
- Operations for Vector Space Bases, R 602
- Operations for Words, R 327
- Operations on elements of the algebra, R 345
- Operations on hom cosets, N 14
- Operations on rewriting systems, R 344
- Operations Records, T 82
- Operations to Evaluate Strings, R 257
- Operations to Produce or Manipulate Strings, R 254
- Operations vs. Dispatcher Functions, T 82
- Operations which have Special Methods for Groups with Pcgs, R 450
- operators, R 42, T 21
  - arithmetic, R 48
  - associativity, R 49
  - for cyclotomics, R 161
  - for lists, R 184
  - precedence, R 49
- Operators for Character Tables, R 733
- Operators for Matrices, R 223
- Operators for Row Vectors, R 214
- Optimization and Compiler Options, R 838
- options, R 27
  - command line, filenames, R 29
  - command line, internal, R 31
- options, under UNIX, R 27
- or, R 170
- Orbit, R 399, T 78
- OrbitFusions, R 809
- OrbitGenerators, N 16
- OrbitGeneratorsInv, N 17
- OrbitGeneratorsOfGroup, N 20
- OrbitishF0, E 49
- OrbitLength, R 400
- OrbitLengths, R 400

OrbitLengthsDomain, R 400  
 OrbitPerms, R 415  
 OrbitPowerMaps, R 804  
 Orbits, E 48  
     operation/attribute, R 400  
 Orbits, *R 399*  
 OrbitsDomain, R 400  
 OrbitsishOperation, E 48  
 OrbitsPerms, R 415  
 OrbitStabChain, R 424  
 OrbitStabilizer, R 401  
 OrbitStabilizerAlgorithm, R 401  
 Orbit Stabilizer Methods for Polycyclic Groups,  
     *R 450*  
 Order, R 295, T 78  
     of a class function, R 773  
 order, of a group, R 349  
     of a list, collection or domain, R 273  
     of the prime residue group, R 138  
 OrderedPartitions, R 153  
 ordered partitions, *E 55*  
 ordering, booleans, R 170  
     of records, R 265  
 OrderingByLessThanFunctionNC, R 280  
 OrderingByLessThanOrEqualFunctionNC, R 280  
 OrderingOfRewritingSystem, R 344  
 OrderingOnGenerators, R 282  
 OrderingsFamily, R 280  
 Orderings on families of associative words, *R 282*  
 OrderMod, R 139  
 OrderOfRewritingSystem, R 344  
 OrdersClassRepresentatives, R 736  
 OrdersTom, R 708  
 Ordinal, R 258  
 ordinary character, R 776  
 OrdinaryCharacterTable, R 735  
 OrthogonalComponents, R 789  
 Orthogonal Embeddings, *R 247*  
 OrthogonalEmbeddings, R 247  
 OrthogonalEmbeddingsSpecialDimension, R 785  
 OSX, R 840  
 Other Filters, *R 125*  
 Other Operations Applicable to any Object, *R 114*  
 Other Operations for Character Tables, *R 744*  
 Other Operations for Tables of Marks, *R 712*  
 output, suppressing, R 64  
 OutputLogTo, R 95  
     for streams, R 102

    stop logging output, R 95  
 OutputTextFile, R 103  
 OutputTextNone, R 106  
 OutputTextString, R 104  
 OutputTextUser, R 104  
 overload, P 14

## P

P, Property mark-up, E 16  
 $p$ -group, R 367  
 package, R 845  
 Package Completion, *E 40*  
 Package Interface - Obsolete Functions and Name  
     Changes, *R 849*  
 Packages, *R 834*  
 PadicCoefficients, R 245  
 PadicExtensionNumberFamily, R 694  
 PadicNumber, R 694  
     for pure padics, R 693  
 PadicValuation, R 569  
 Pager, R 25  
 Parametrized, R 812  
 Parametrized Maps, *R 810*  
 parametrized maps, R 801  
 Parent, R 290  
 ParentPcgs, R 440  
 Parents, *R 290*  
 Parents and Subgroups, *T 83*  
 PartialFactorization, R 133  
 Partial Methods, *P 13*  
 partial order, R 315  
 PartialOrderByOrderingFunction, R 316  
 PartialOrderOfHasseDiagram, R 315  
 Partitions, R 153  
 partitions, improper, of an integer, R 154  
     ordered, of an integer, R 154  
     restricted, of an integer, R 154  
 PartitionsGreatestEQ, R 154  
 PartitionsGreatestLE, R 154  
 PartitionsSet, R 152  
 PartitionTuples, R 155  
 PcElementByExponents, R 438  
 PcElementByExponentsNC, R 438  
 PCentralLieAlgebra, R 650  
 PCentralNormalSeriesByPcgsPGroup, R 445  
 PCentralSeries, R 371  
 PcGroupCode, R 461  
 PcGroupCodeRec, R 461

- PcGroupFpGroup, R 454
- Pc groups versus fp groups, *R 454*
- PcGroupWithPcgs, R 456
- Pcgs, R 436
- Pcgs.OrbitStabilizer, R 450
- Pcgs and Normal Series, *R 444*
- PcgsByPcSequence, R 436
- PcgsByPcSequenceNC, R 436
- PcgsCentralSeries, R 444
- PcgsChiefSeries, R 445
- PcgsElementaryAbelianSeries, R 444
- PcgsPCentralSeriesPGroup, R 445
- PClassPGroup, R 368
- PCore, R 361
- PcSeries, R 437
- PerfectGroup, R 522
- perfect groups, R 522
- PerfectIdentification, R 523
- PerfectResiduum, R 363
- Perform, R 200
- Permanent, R 156
- Permanent of a Matrix, *R 156*
- PermBounds, R 798
- PermCharInfo, R 793
- PermCharInfoRelative, R 794
- PermChars, R 795
- PermCharsTom, R 721
- PermComb, R 798
- PermGroupOps.ElementProperty, T 78
- PermLeftQuoTransformation, R 556
- PermList, R 414
- PermListList, R 200
- Permutation, R 405
- PermutationCharacter, R 776
- permutation character, R 821
- permutation characters, possible, R 792
- PermutationCycle, R 405
- PermutationCycleOp, R 405
- PermutationGModule, R 696
- Permutation groups, *T 44*
- PermutationMat, R 227
- PermutationsFamily, R 411
- Permutations Induced by Elements and Cycles,  
*R 405*
- PermutationsList, R 151
- PermutationTom, R 707
- Permuted, R 201
  - as a permutation action, R 399
  - for class functions, R 773
- PGL, R 515
- PGU, R 515
- Phi, R 138
- Plain Lists, *T 27*
- Plain Records, *T 38*
- point stabilizer, R 401
- Polycyclic Generating Systems, *R 435*
- PolynomialByExtRep, R 689
- PolynomialByExtRepNC, R 689
- PolynomialCoefficientsOfPolynomial, R 674
- PolynomialDivisionAlgorithm, R 685
- Polynomial Factorization, *R 677*
- PolynomialModP, R 677
- PolynomialReducedRemainder, R 685
- PolynomialReduction, R 684
- PolynomialRing, R 680
- Polynomial Rings, *R 680*
- Polynomials, *T 85*
- Polynomials as Univariate Polynomials in one  
Indeterminate, *R 674*
- polynomials over abelian number fields, factors,  
R 592
- Polynomials over the Rationals, *R 677*
- PopOptions, R 88
- Portability, *R 90*
- Porting GAP, *R 839*
- Position, R 190, T 78
- Positional Objects, *P 22*
- PositionBound, R 192
- PositionCanonical, R 191
- PositionFirstComponent, R 193
- PositionNonZero, R 193
- PositionNot, R 193
- PositionNthOccurrence, R 191
- PositionProperty, R 192
- Positions, R 191
- PositionSet, R 192
- PositionsOp, R 191
- PositionSorted, R 191
- PositionStream, R 100
- PositionSublist, R 193
- Position vs. PositionCanonical, T 49
- PositionWord, R 334
- PositiveIntegers, R 126
- positive number, R 48
- PositiveRoots, R 646
- PositiveRootVectors, R 646

- PossibleClassFusions, R 808
- PossibleFusionsCharTableTom, R 720
- Possible Permutation Characters, *R 792*
- possible permutation characters, R 795
- PossiblePowerMaps, R 802
- power, R 48
  - matrix, R 224
  - meaning for class functions, R 772
  - of words, R 334
- PowerMap, R 802
- PowerMapByComposition, R 804
- PowerMapOp, R 802
- Power Maps, *R 801*
- PowerMapsAllowedBySymmetrizations, R 819
- PowerMod, R 571
- PowerModCoeffs, R 220
- PowerModInt, R 131
- PowerPartition, R 155
- powerset, R 149
- PowerSubalgebraSeries, R 623
- PQuotient, R 476
- precedence, R 48
- precedence test, for permutations, R 412
- PreferredGenerators, N 17
- PrefrattiniSubgroup, R 363
  - for groups with pcgs, R 450
- PreImage, R 308
- PreImageElm, R 308
- PreImages, R 308
- PreImagesElm, R 307
- Preimages in the Free Group, *R 464*
- Preimages in the Free Semigroup, *R 550*
- PreimagesOfTransformation, R 555
- PreImagesRange, R 307
- PreImagesRepresentative, R 308
- PreImagesSet, R 308
- Preimages under Homomorphisms from an FpGroup, *R 475*
- Preimages under Mappings, *R 307*
- preorder, R 315
- PresentationFpGroup, R 481
- PresentationNormalClosure, R 486
- PresentationNormalClosureRrs, R 486
- PresentationSubgroup, R 484
- PresentationSubgroupMtc, R 485
- PresentationSubgroupRrs, R 484
- PresentationViaCosetTable, R 482
- previous result, R 64
- PrevPrimeInt, R 132
- PrimaryGeneratorWords, R 485
- primary subgroup generators, R 499
- PrimeBlocks, R 741
- PrimeBlocksOp, R 741
- PrimeField, R 579
- Prime Integers and Factorization, *R 131*
- PrimePGroup, R 368
- PrimePowersInt, R 134
- prime residue group, R 138
  - exponent, R 139
  - generator, R 140
  - order, R 138
- Prime Residues, *R 138*
- PrimeResidues, function, R 138
- Primes, R 131
- primitive, R 407
- PRIMITIVE\_INDICES\_MAGMA, R 528
- PrimitiveElement, R 579
- PrimitiveGroup, R 527
- Primitive Groups, *R 417*
- PrimitiveGroupsIterator, R 527
- PrimitiveIdentification, R 528
- PrimitiveIndexIrreducibleSolvableGroup, R 529
- Primitive Permutation Groups, *R 526*
- PrimitivePolynomial, R 677
- PrimitiveRoot, R 587
- PrimitiveRootMod, R 140
- primitive root modulo an integer, R 140
- Primitive Roots and Discrete Logarithms, *R 139*
- Primitivity of Characters, *R 824*
- Print, R 66, T 78
- PrintAmbiguity, R 815
- PrintArray, R 228
- PrintCharacterTable, R 750
- PrintFactorsInt, R 134
- PrintFormattingStatus, R 102
- PrintHashWithNames, N 10
- Printing, Viewing and Displaying Finite Field Elements, *R 589*
- Printing Character Tables, *R 747*
- Printing Class Functions, *R 773*
- Printing Presentations, *R 487*
- Printing Tables of Marks, *R 705*
- PrintObj, R 67
  - for character tables, R 773
  - for tables of marks, R 705



PrintTo, R 95, T 78  
     for streams, R 101  
 ProbabilityShapes, R 678  
 problems, R 836  
 Problems on Particular Systems, R 838  
 procedure call, R 50  
 Procedure Calls, R 50  
 procedure call with arguments, R 50  
 Process, R 107  
 Process, R 107  
 PROD\_GF2MAT\_GF2MAT\_ADVANCED, R 238  
 PROD\_GF2MAT\_GF2MAT\_SIMPLE, R 238  
 Producing a Manual, E 26  
 Product, R 204  
 product, of words, R 334  
     rational functions, R 670  
 ProductCoeffs, R 220  
 ProductOfStraightLinePrograms, R 342  
 ProductSpace, R 623  
 ProductX, R 206  
 ProfileFunctions, R 83  
 ProfileGlobalFunctions, R 83  
 ProfileMethods, R 82  
 ProfileOperations, R 82  
 ProfileOperationsAndMethods, R 82  
 PROFILETHRESHOLD, R 83  
 Profiling, R 82  
 ProjectedInducedPcgs, R 443  
 ProjectedPcElement, R 443  
 Projection, N 18, R 305  
     example for direct products, R 504  
     example for semidirect products, R 506  
     example for subdirect products, R 507  
     example for wreath products, R 507  
     for group products, R 509  
 ProjectionMap, R 811  
 projections, find all, R 393  
 ProjectiveActionHomomorphismMatrixGroup,  
     R 430  
 ProjectiveActionOnFullSpace, R 430  
 ProjectiveGeneralLinearGroup, R 515  
 ProjectiveGeneralUnitaryGroup, R 515  
 ProjectiveOrder, R 237  
 ProjectiveSpecialLinearGroup, R 515  
 ProjectiveSpecialUnitaryGroup, R 515  
 ProjectiveSymplecticGroup, R 515  
 prompt, R 64  
     partial, R 64

Properties, R 124  
 Properties and Attributes for Lists, R 193  
 Properties and Attributes of (General) Mappings,  
     R 305  
 Properties and Attributes of Binary Relations, R 314  
 Properties and Attributes of Matrices, R 225  
 Properties and Attributes of Rational Functions,  
     R 671  
 Properties and basic functionality, R 281  
 Properties and Filters, T 73  
 Properties of a Lie Algebra, R 644  
 Properties of rewriting systems, R 346  
 Properties of Rings, R 566  
 Properties of Tables of Marks, R 711  
 PRump, R 364  
 PseudoRandom, R 277  
 PSL, R 515  
 PSP, R 515  
 PSp, R 515  
 PSU, R 515  
 PthPowerImage, R 650  
 PthPowerImages, R 650  
 Pure p-adic Numbers, R 693  
 PurePadicNumberFamily, R 693  
 PushOptions, R 88

## Q

Quadratic, R 164  
 quadratic residue, R 141  
 QuaternionAlgebra, R 618  
 QUIET, R 850  
 QUIT, emergency quit, R 73  
 quit, in emergency, R 73  
 quit, R 68, T 18  
 QUITTING, R 73  
 QuoInt, R 129  
 Quotient, R 562  
 quotient, for finitely presented groups, R 463  
     matrices, R 224  
     matrix and matrix list, R 225  
     matrix and scalar, R 224  
     of free monoid, R 551  
     of free semigroup, R 549  
     of words, R 334  
     rational functions, R 670  
     scalar and matrix, R 224  
     scalar and matrix list, R 225  
     vector and matrix, R 224

QuotientFromSCTable, R 617  
 QuotientGroup, N 18  
 QuotientGroupByChainHomomorphicImage, N 21  
 QuotientGroupByHomomorphism, N 14  
 QuotientGroupByImages, N 14  
 QuotientGroupByImagesNC, N 14  
 QuotientGroupHom, N 14  
 Quotient Methods, *R 476*  
 QuotientMod, R 571  
 QuotientPolynomialsExtRep, R 690  
 QuotientRemainder, R 570  
 Quotients, *R 541*  
 Quotients and Remainders, *R 129*  
 QuotientSemigroupCongruence, R 541  
 QuotientSemigroupHomomorphism, R 541  
 QuotientSemigroupPreimage, R 541  
 QuotRemLaurpols, R 679

## R

R, Representation mark-up, E 16  
 $r_N$ , R 162  
 RadicalGroup, R 363  
 RadicalOfAlgebra, R 626  
 Random, R 136  
   [coll], R 276  
   for integers, R 129  
   for rationals, R 146  
 RandomBinaryRelationOnPoints, R 316  
 random element, of a list or collection, R 276  
 Random Elements, *R 276*  
 RandomHashKey, N 10  
 RandomInvertibleMat, T 79  
 RandomInvertibleMat, R 229  
 RandomIsomorphismTest, R 461  
 Random Isomorphism Testing, *R 461*  
 Randomized Methods for Permutation Groups,  
   *R 419*  
 RandomList, R 277  
 RandomMat, R 229  
 Random Matrices, *R 229*  
 RandomPrimitivePolynomial, R 589  
 RandomSchreierSims, N 20  
 random seed, R 277  
 RandomSource, R 137  
 Random Sources, *R 136*  
 RandomTransformation, R 554  
 RandomUnimodularMat, R 229  
 Range, N 15, R 306  
 range, R 206  
 Ranges, *R 206, T 32*  
 RankAction, R 406  
 RankFilter, R 117  
 RankMat, R 229  
 RankOfTransformation, R 555  
 RankPGroup, R 368  
 Rat, R 146  
   for strings, R 257  
 RationalClass, R 360  
 RationalClasses, R 361  
 RationalFunctionByExtRep, R 689  
 RationalFunctionByExtRepNC, R 689  
 RationalFunctionByExtRepWithCancellation,  
   R 690  
 Rational Function Families, *R 686*  
 RationalFunctionsFamily, R 686  
 RationalizedMat, R 165  
 Rationals, R 145  
 RClassOfHClass, R 542  
 Read, R 94, T 19  
   for streams, R 99  
 read.g, for a GAP package, E 38  
 ReadAll, R 99  
 ReadAllLine, R 105  
 ReadAsFunction, R 94  
   for streams, R 99  
 ReadByte, R 99  
 read eval print loop, R 64  
 read evaluate print loop, *T 19*  
 reading source code from a file, T 19  
 ReadLine, R 99  
 README, for a GAP package, E 36  
 ReadPackage, R 846  
 ReadPkg, R 849  
 ReadTest, R 84  
   for streams, R 99  
 RealClasses, R 739  
 RealizableBrauerCharacters, R 799  
 RecFields, T 79  
 RecNames, R 261  
 Recognizing Characters, *R 253*  
 record, component access, R 262  
   component assignment, R 262  
   component variable, R 262  
   component variable assignment, R 263  
 Record Access Operations, *R 266*  
 Record Assignment, *R 262*

- record assignment, operation, R 266
- record boundness test, operation, R 266
- record component, operation, R 266
- record unbind, operation, R 266
- Recovery from NoMethodFound-Errors, *R 77*
- Recursion, *T 42*
- recursion, R 55
- Redispatching, *P 13*
- RedispatchOnCondition, *P 13*
- redisplay a help section, R 23
- redisplay with next help viewer, R 23
- ReduceCoeffs, R 220
- ReduceCoeffsMod, R 220
- ReducedAdditiveInverse, R 345
- ReducedCharacters, R 783
- ReducedClassFunctions, R 782
- ReducedComm, R 345
- ReducedConfluentRewritingSystem, R 552
- ReducedConjugate, R 345
- ReducedDifference, R 345
- ReducedForm, R 344
- ReducedGroebnerBasis, R 686
- ReducedInverse, R 345
- ReducedLeftQuotient, R 345
- ReducedOne, R 345
- ReducedPcElement, R 438
- ReducedPower, R 345
- ReducedProduct, R 345
- ReducedQuotient, R 345
- ReducedScalarProduct, R 345
- ReducedSum, R 345
- ReducedZero, R 345
- ReduceRules, R 345
- ReduceStabChain, R 425
- Reducing Virtual Characters, *R 782*
- Ree, R 512
- ReeGroup, R 512
- ReesCongruenceOfSemigroupIdeal, R 540
- ReesMatrixSemigroup, R 543
- ReesMatrixSemigroupElement, R 544
- Rees Matrix Semigroups, *R 543*
- ReesZeroMatrixSemigroup, R 543
- ReesZeroMatrixSemigroupElement, R 544
- ReesZeroMatrixSemigroupElementIsZero, R 544
- reference to a label, E 15
- RefinedPcGroup, R 456
- ReflectionMat, R 228
- ReflexiveClosureBinaryRelation, R 316
- reflexive relation, R 314
- regular, R 406
- regular action, R 403
- RegularActionHomomorphism, R 404
- RegularModule, R 753
- relations, R 303
- Relations Between Domains, *R 297*
- RelationsOfFpSemigroup, R 550
- RelativeBasis, R 602
- RelativeBasisNC, R 602
- relatively prime, R 48
- RelativeOrderOfPcElement, R 438
- RelativeOrders, of a pcgs, R 437
- Relators in a Presentation, *R 487*
- RelatorsOfFpGroup, R 464
- remainder, operation, R 296
- remainder of a quotient, R 129
- RemInt, R 129
- Remove, R 177
- remove, an element from a set, R 197
- RemoveCharacters, R 255
- RemoveFile, R 96
- RemoveOuterCoeffs, R 218
- RemoveRelator, R 489
- RemoveSet, R 197
- RemoveStabChain, R 425
- Repeat, *R 52*
- repeat loop, R 52
- ReplacedString, R 255
- Representation, *R 120*
- representation, as a sum of two squares, R 144
- Representations for Associative Words, *R 336*
- Representations for Group Homomorphisms, *R 395*
- Representations given by modules, *R 753*
- Representations of Algebras, *R 631*
- RepresentationsOfObject, R 121
- Representative, R 273
- representative, of a list or collection, R 274
- RepresentativeAction, R 402
- RepresentativeLinearOperation, R 631
- RepresentativeOperation, R 849
- RepresentativesContainedRightCosets, R 358
- RepresentativesFusions, R 809
- RepresentativeSmallest, R 274
- RepresentativesMinimalBlocks, R 407
- RepresentativesPerfectSubgroups, R 376
- RepresentativesPowerMaps, R 804
- RepresentativesSimpleSubgroups, R 376

- RepresentativeTom, R 719
- RepresentativeTomByGenerators, R 719
- RepresentativeTomByGeneratorsNC, R 719
- Requesting one GAP Package from within Another, *E 37*
- RequirePackage, R 849
- Reread, R 96
- REREADING, R 96
- RereadPackage, R 846
- RereadPkg, R 849
- Reset, R 136
- ResetFilterObj, P 18
- ResetOptionsStack, R 88
- residue, quadratic, R 141
- Residue Class Rings, *R 134*
- RespectsAddition, R 311
- RespectsAdditiveInverses, R 311
- RespectsInverses, R 310
- RespectsMultiplication, R 310
- RespectsOne, R 310
- RespectsScalarMultiplication, R 311
- RespectsZero, R 311
- RestoreStateRandom, R 276
- Restricted and Induced Class Functions, *R 781*
- RestrictedClassFunction, R 781
- RestrictedClassFunctions, R 781
- Restricted Lie algebras, *R 649*
- RestrictedMapping, R 305
- RestrictedPartitions, R 154
- RestrictedPerm, R 414
- RestrictedPermNC, R 414
- RestrictedTransformation, R 555
- RestrictOutputsOfSLP, R 341
- Resultant, R 675
- ResultOfStraightLineProgram, R 339
- Return, *R 58*
- return, R 68
  - no value, R 58
  - with value, R 58
- ReturnFail, R 63
- ReturnFalse, R 63
- return from break loop, R 68
- ReturnTrue, R 63
- Reversed, R 199
- RewindStream, R 100
- RewriteWord, R 470
- Rewriting in Groups and Monoids, *R 346*
- Rewriting Systems and the Knuth-Bendix Procedure, *R 552*
- RightActingAlgebra, R 634
- RightActingRingOfIdeal, R 565
- RightAlgebraModule, R 632
- RightAlgebraModuleByGenerators, R 632
- RightCoset, R 356
- RightCosets, R 357
- right cosets, R 356
- RightCosetsNC, R 357
- RightDerivations, R 641
- RightIdeal, R 563
- RightIdealByGenerators, R 564
- RightIdealNC, R 564
- RightModuleByHomomorphismToMatAlg, R 635
- RightShiftRowVector, R 218
- RightTransversal, R 357
- right transversal, T 48
- Ring, R 561
- RingByGenerators, R 562
- Ring Homomorphisms, *R 312*
- Rings With One, *R 565*
- RingWithOne, R 565
- RingWithOneByGenerators, R 566
- RNamObj, R 266
- root, of 1 modulo an integer, R 142
  - of an integer, R 128
  - of an integer, smallest, R 128
  - of an integer modulo another, R 141
- RootInt, R 128
- RootMod, R 141
- RootOfDefiningPolynomial, R 579
- RootsMod, R 141
- Roots Modulo Integers, *R 140*
- roots of unity, R 157
- RootsOfUPol, R 674
- RootsUnityMod, R 142
- RootSystem, R 646
- RoundCyc, R 159
- Row and Matrix Spaces, *R 606*
- RowIndexOfReesMatrixSemigroupElement, R 544
- RowIndexOfReesZeroMatrixSemigroupElement, R 544
- row spaces, R 606
- Row Vectors over Finite Fields, *R 216*
- Rules, R 344
- Running GAP under MacOS, *R 31*
- Runtime, R 82

Runtimes, R 81

## S

$s_N$ , R 162

SameBlock, R 742

SandwichMatrixOfReesMatrixSemigroup, R 544

SandwichMatrixOfReesZeroMatrixSemigroup,  
R 544

save, R 37

SaveOnExitFile, R 73

SaveWorkspace, R 37

Saving and Loading a Workspace, *R 37*

Saving a Pc Group, *R 457*

saving on exit, R 73

ScalarProduct, for characters, R 777

Schreier, R 484

Schreier-Sims, random, R 419

SchreierTransversal, N 16

SchreierTreeDepth, N 17

SchurCover, R 382

Schur Covers and Multipliers, *R 382*

Schur multiplier, R 382

scope, R 43

ScriptFromString, R 716

Searching for Homomorphisms, *R 393*

SecHMSM, R 259

secondary subgroup generators, R 499

SecondsDMYhms, R 259

SeekPositionStream, R 100

Selecting a Different MeatAxe, *R 697*

Selection Functions, *R 517*

SemidirectProduct, R 505

Semidirect Products, *R 505*

SemiEchelonBasis, R 608

SemiEchelonBasisNC, R 608

SemiEchelonMat, R 231

SemiEchelonMatDestructive, R 232

SemiEchelonMats, R 232

SemiEchelonMatsDestructive, R 232

SemiEchelonMatTransformation, R 232

Semigroup, R 538

semigroup, R 538

SemigroupByGenerators, R 538

SemigroupByMultiplicationTable, R 539

SemigroupIdealByGenerators, R 540

SemigroupOfRewritingSystem, R 553

semiregular, R 406

Semisimple Lie Algebras and Root Systems, *R 645*

SemiSimpleType, R 645

sequence, Bernoulli, R 148

Fibonacci, R 155

Lucas, R 156

Series of Ideals, *R 643*

Set, R 270

SetAssertionLevel, R 81

SetCommutator, R 455

SetConjugate, R 455

SetCrystGroupDefaultAction, R 434

set difference, of collections, R 275

SetElmWPObj, E 52

SetEntrySCTable, R 616

SetFilterObj, P 18

SetGasmanMessageStatus, R 87

SetHashEntry, N 12

SetHashEntryAtLastIndex, N 12

SetHelpViewer, R 24

SetIndeterminateName, R 669

SetInfoLevel, R 80

SetName, R 114

Set Operations via Boolean Lists, *R 211*

SetParent, R 290

SetPower, R 455

SetPrintFormattingStatus, R 102

SetRecursionTrapInterval, R 86

SetReducedMultiplication, R 464

Sets, *R 110, T 31*

sets, R 196

Sets of Subgroups, *R 373*

set stabilizer, R 401

Setter, R 122

setter, R 122

of an attribute, T 72

Setter and Tester for Attributes, *R 122*

SetX, R 206

ShallowCopy, R 113, T 80

for lists, R 180

ShiftedCoeffs, R 220

ShiftedPadicNumber, R 693

Shifting and Trimming Coefficient Lists, *R 218*

ShortestVectors, R 247

ShortLexOrdering, R 283

short vectors spanning a lattice, R 783

ShowArgument, R 77

ShowArguments, R 77

ShowDetails, R 77

ShowImpliedFilters, R 118

- ShowMethods, R 78
- ShowOtherMethods, R 78
- ShrinkAllocationPlist, R 182
- ShrinkAllocationString, R 252
- ShrinkCoeffs, R 221
- ShrinkRowVector, R 218
- Sift, for chains of subgroups, N 19
- SiftedPcElement, R 438
- SiftedPermutation, R 424
- SiftedVector, R 609
- SiftOneLevel, for chains of subgroups, N 19
  - for subgroup transversals, N 16
- Sigma, R 142
- sign, of an integer, R 127
- Sign and Cycle Structure, R 413
- SignInt, R 127
- SignPartition, R 154
- SignPerm, R 413
- SimpleLieAlgebra, R 641
- SimpleSystem, R 646
- SimplifiedFpGroup, R 483
- SimplifiedFpGroup, R 483
- SimplifyPresentation, R 490
- SimsNo, R 528
- SimultaneousEigenvalues, R 238
- SingleCollector, R 455
- singlequote character, R 251
- singlequotes, R 249
- SINT\_CHAR, R 257
- Size, R 273
  - for character tables, R 735
  - for groups with pcgs, R 450
- size, of a list or collection, R 273
- SizeBlist, R 211
- SizeConsiderFunction, R 378
- SizeNumbersPerfectGroups, R 523
- SizeOfChainOfGroup, N 20
- SizeOfFieldOfDefinition, R 799
- SizesCentralizers, R 736
- SizesConjugacyClasses, R 736
- SizeScreen, R 76
- SizeScreen, R 76
- SizesPerfectGroups, R 522
- SizeStabChain, R 423
- SL, R 513
- smaller, associative words, R 333
  - elements of finitely presented groups, R 464
  - nonassociative words, R 327
- pcwords, R 453
- rational functions, R 671
- SmallerDegreePermutationRepresentation, R 416
- smaller or equal, R 47
- smaller test, R 47
- SmallestGeneratorPerm, R 412
- SmallestMovedPoint, R 412
- SmallestRootInt, R 128
- SmallGeneratingSet, R 379
- SmallGroup, R 520
- Small Groups, R 519
- SmallGroupsInformation, R 520
- Smash MeatAxe Flags, R 701
- smith normal form, R 850
- SmithNormalFormIntegerMat, R 242
- SmithNormalFormIntegerMatTransforms, R 242
- SMTX.AbsoluteIrreducibilityTest, R 700
- SMTX.AlgEl, R 701
- SMTX.AlgElCharPol, R 701
- SMTX.AlgElCharPolFac, R 701
- SMTX.AlgElMat, R 701
- SMTX.AlgElNullspaceDimension, R 701
- SMTX.AlgElNullspaceVec, R 701
- SMTX.CentMat, R 701
- SMTX.CentMatMinPoly, R 701
- SMTX.CompleteBasis, R 700
- SMTX.Getter, R 700
- SMTX.GoodElementGModule, R 700
- SMTX.IrreducibilityTest, R 700
- SMTX.MatrixSum, R 700
- SMTX.MinimalSubGModule, R 700
- SMTX.MinimalSubGModules, R 700
- SMTX.RandomIrreducibleSubGModule, R 700
- SMTX.Setter, R 700
- SMTX.SortHomGModule, R 700
- SMTX.Subbasis, R 701
- SO, R 514
- Socle, R 364
- SocleTypePrimitiveGroup, R 417
- SolutionIntMat, R 240
- SolutionMat, R 230
- SolutionMatDestructive, R 230
- SolutionNullspaceIntMat, R 240
- Some Remarks about Character Theory in GAP, R 724
- Some Special Algebras, R 618
- Something, T 70

- Sort, R 195
- SortedCharacters, R 760
- SortedCharacterTable, R 761
- Sorted Character Tables, *R 760*
- SortedList, R 270
- sorted list, R 194
- Sorted Lists and Sets, *R 196*
- sorted lists as collections, R 268
- SortedSparseActionHomomorphism, R 403
- SortedTom, R 706
- Sortex, R 195
- Sorting Lists, *R 195*
- SortingPerm, R 196
- Sorting Tables of Marks, *R 706*
- SortParallel, R 195
- Source, N 15, R 306
- SourceElt, N 14
- SourceOfIsoclinicTable, R 759
- SP, R 514
- Sp, R 514
- space, R 41
- SparseActionHomomorphism, R 403
- SparseCartanMatrix, R 647
- SparseHashTable, N 11
- Sparse hash tables, *N 11*
- SparseIntKey, N 11
- Special Characters, *R 251*
- special character sequences, R 251
- Special Filenames, *R 93*
- Special Generating Sets, *R 379*
- SpecialLinearGroup, R 513
- Special Multiplication Algorithms for Matrices over  $\text{GF}(2)$ , *R 238*
- SpecialOrthogonalGroup, R 514
- Special Pcgs, *R 447*
- SpecialPcgs, attribute, R 447
- Special Rules for Input Lines, *R 65*
- SpecialUnitaryGroup, R 514
- Specific and Parametrized Subgroups, *R 362*
- Specific Methods for Subgroup Lattice Computations, *R 376*
- SplitCharacters, R 755
- SplitExtension, R 459
- SplitExtensions, R 460
- SplitString, R 254
- SplittingField, R 673
- Sqrt, R 296
- square root, of an integer, R 128
- SquareRoots, R 324
- SSortedList, R 270
- StabChain, R 421
- StabChainBaseStrongGenerators, R 422
- StabChainImmutable, R 421
- StabChainMutable, R 421
- StabChainOp, R 421
- StabChainOptions, R 422
- Stabiliser chain subgroups, *N 20*
- Stabilizer, R 401
- Stabilizer Chain Records, *R 422*
- Stabilizer Chains, *R 418*
- Stabilizer Chains for Automorphisms Acting on Enumerators, *E 61*
- StabilizerOfExternalSet, R 409
- StabilizerPcgs, R 450
- Stabilizers, *R 401*
- Standalone Programs in a GAP Package, *E 38*
- StandardAssociate, R 568
- StandardGeneratorsFunctions, R 716
- StandardGeneratorsInfo, for groups, R 715  
for tables of marks, R 720
- StandardGeneratorsOfGroup, R 717
- Standard Generators of Groups, *R 715*
- Standardization of coset tables, *R 469*
- StandardizeTable, R 469
- StarCyc, R 164
- Starting and Leaving GAP, *T 18*
- starting GAP, *T 18*
- State, R 136
- Statements, *R 49*
- StateRandom, R 276
- Stirling1, R 148
- Stirling2, R 149
- Stirling number of the first kind, R 148
- Stirling number of the second kind, R 149
- StoredGroebnerBasis, R 686
- StoreFusion, R 807
- Storing Normal Subgroup Information, *R 765*
- StraightLineProgElm, R 342
- StraightLineProgGens, R 343
- StraightLineProgram, R 338
- Straight Line Program Elements, *R 342*
- StraightLineProgramNC, R 338
- Straight Line Programs, *R 338*
- StraightLineProgramsTom, R 718
- StratMeetPartition, *E 59*
- StreamsFamily, R 98

- StretchImportantSLPElement, R 343
- strictly sorted list, R 194
- String, R 254
  - for cyclotomics, R 159
- StringDate, R 259
- StringOfResultOfStraightLineProgram, R 340
- StringPP, R 254
- strings, T 29
  - equality of, R 253
  - inequality of, R 253
  - lexicographic ordering of, R 253
- String Streams, *R 104*
- StringTime, R 259
- StrongGeneratorsStabChain, R 424
- StrongGens, N 20
- StronglyConnectedComponents, R 316
- Struct, R 287
- StructByGenerators, R 288
- StructuralCopy, R 113, T 80
  - for lists, R 180
- structure constant, R 747
- StructureConstantsTable, R 604
- StructureDescription, R 354
- Structure Descriptions, *R 354*
- StructWithGenerators, R 288
- SU, R 514
- Subalgebra, R 619
- SubAlgebraModule, R 635
- SubalgebraNC, R 619
- Subalgebras, *R 619*
- SubalgebraWithOne, R 619
- SubalgebraWithOneNC, R 620
- SubdirectProduct, R 507
- Subdirect Products, *R 507*
- SubdirectProducts, R 507
- Subdomains, *T 71*
- subdomains, R 291
- Subfield, R 579
- SubfieldNC, R 579
- Subfields, R 579
- Subfields of Fields, *R 579*
- Subgroup, R 351
- SubgroupByPcgs, R 441
- SubgroupByProperty, R 352
- subgroup fusions, R 805
- subgroup generators tree, R 499
- Subgroup Lattice, *R 374*
- SubgroupNC, R 351
- SubgroupOfWholeGroupByCosetTable, R 470
- SubgroupOfWholeGroupByQuotientSubgroup, R 475
- Subgroup Presentations, *R 484*
- SubgroupProperty, R 426
- Subgroups, Subgroups, as Stabilizers, *T 50*
- Subgroups, *R 351*
- subgroups, polyhedral, R 746
- Subgroups characterized by prime powers, *R 365*
- Subgroup Series, *R 369*
- SubgroupShell, R 352
- Subgroups of Polycyclic Groups - Canonical Pcgs, *R 441*
- Subgroups of Polycyclic Groups - Induced Pcgs, *R 440*
- SubgroupsSolvableGroup, R 377
- sublist, R 174
  - access, R 174
  - assignment, R 176
  - operation, R 175
- sublist assignment, operation, R 177
- Submagma, R 320
- SubmagmaNC, R 320
- SubmagmaWithInverses, R 320
- SubmagmaWithInversesNC, R 320
- SubmagmaWithOne, R 320
- SubmagmaWithOneNC, R 320
- Submodule, R 574
- SubmoduleNC, R 574
- Submodules, *R 574*
- Submonoid, R 545
- SubmonoidNC, R 545
- SubnearAdditiveGroup, R 559
- SubnearAdditiveGroupNC, R 559
- SubnearAdditiveMagma, R 559
- SubnearAdditiveMagmaNC, R 559
- SubnearAdditiveMagmaWithZero, R 559
- SubnearAdditiveMagmaWithZeroNC, R 559
- SubnormalSeries, R 369
- Subring, R 562
- SubringNC, R 562
- SubringWithOne, R 566
- SubringWithOneNC, R 566
- Subroutines for the Construction of Class Fusions, *R 820*
- Subroutines for the Construction of Power Maps, *R 818*
- subsection mark-up, E 16



- Subsemigroup, R 538
  - SubsemigroupNC, R 538
  - subsets, R 149
  - subset test, for collections, R 274
  - Subsomething, T 71
  - SubsomethingNC, T 71
  - Subspace, R 598
  - SubspaceNC, R 598
  - Subspaces, R 600
  - SubstitutedWord, R 335
  - SubsTom, R 708
  - Substruct, R 291
  - SubstructNC, R 291
  - SubSyllables, R 336
  - subtract, a set from another, R 198
  - SubtractBlist, R 212
  - subtraction, R 48
    - matrices, R 223
    - matrix and scalar, R 223
    - rational functions, R 670
    - scalar and matrix, R 223
    - scalar and matrix list, R 225
    - scalar and vector, R 215
    - vector and scalar, R 215
    - vectors, R 215
  - SubtractSet, R 198
  - Subword, R 334
  - Successors, R 315
  - Suitability for Compilation, *R 36*
  - Sum, R 204
  - Sum and Intersection of Pcgs, *R 446*
  - SumFactorizationFunctionPcgs, R 446
  - SumIntersectionMat, R 233
  - SumX, R 206
  - SupersolvableResiduum, R 364
  - support, email address, R 837, T 16
  - SupportedCharacterTableInfo, R 728
  - Suppressing Indexing and Labelling of a Section and Resolving Label Clashes, *E 15*
  - SurjectiveActionHomomorphismAttr, R 410
  - SuzukiGroup, R 512
  - SylowComplement, R 364
  - SylowSubgroup, R 364
  - Sylow Subgroups and Hall Subgroups, *R 364*
  - SylowSystem, R 365
  - Symbols, *R 40*
  - Symmetric and Alternating Groups, *R 416*
  - SymmetricClosureBinaryRelation, R 316
  - SymmetricGroup, R 512
  - symmetric group, powermap, R 155
  - SymmetricParentGroup, R 417
  - SymmetricParts, R 789
  - SymmetricPowerOfAlgebraModule, R 660
  - symmetric relation, R 315
  - Symmetrizations, R 788
  - symmetrizations, orthogonal, R 789
    - symplectic, R 790
  - Symmetrizations of Class Functions, *R 788*
  - SymplecticComponents, R 790
  - SymplecticGroup, R 514
  - syntax errors, R 64
  - system getter, R 121
  - system setter, R 121
  - Sz, R 512
- T**
- $t_N$ , R 162
  - TableAutomorphisms, R 763
  - table automorphisms, R 809
  - TableHasIntKeyFun, N 11
  - table of chapters for help books, R 23
  - TableOfMarks, R 703
  - TableOfMarksByLattice, R 704
  - TableOfMarksComponents, R 707
  - TableOfMarksCyclic, R 722
  - TableOfMarksDihedral, R 722
  - TableOfMarksFamily, R 707
  - TableOfMarksFrobenius, R 722
  - Table of Marks Objects in GAP, *R 703*
  - table of sections for help books, R 23
  - tables, E 23, R 726
  - Tables, Displayed Mathematics and Mathematics Alignments, *E 23*
  - tabulator, R 41
  - Tau, R 142
  - Technical Details about Tables of Marks, *R 707*
  - Technical Details about the Implementation of Magma Rings, *R 666*
  - Technical Matters Concerning General Mappings, *R 312*
  - TemporaryGlobalVarName, R 46
  - Tensored, R 780
  - TensorProductGModule, R 696
  - TensorProductOfAlgebraModules, R 659
  - Tensor Products and Exterior and Symmetric Powers, *R 659*

- test, for a primitive root, *R* 140
  - for a rational, *R* 145
  - for records, *R* 261
  - for set equality, *R* 197
- TestConsistencyMaps**, *R* 814
- Tester**, *R* 122
- tester, *R* 122
  - of an attribute, *T* 72
- Test Files, *R* 84
- Test for the Existence of GAP Package Binaries, *E* 39
- TestHomogeneous**, *R* 824
- TestInducedFromNormalSubgroup**, *R* 826
- Testing Finiteness of Finitely Presented Groups, *R* 479
- Testing for the System Architecture, *R* 35
- Testing Monomiality, *R* 826
- Testing the Examples, *E* 24
- TestJacobi**, *R* 616
- TestMonomial**, *R* 826
- TestMonomialQuick**, *R* 827
- TestMonomialUseLattice**, *R* 827
- Test of the installation, *R* 833
- TestPackageAvailability**, *R* 847
- TestPerm1**, *R* 796
- TestPerm2**, *R* 796
- TestPerm3**, *R* 796
- TestPerm4**, *R* 796
- TestPerm5**, *R* 796
- TestQuasiPrimitive**, *R* 825
- TestRelativelySM**, *R* 828
- Tests for Actions, *R* 406
- Tests for the Availability of Methods, *R* 383
- TestSubnormallyMonomial**, *R* 828
- TeX Macros, *E* 16
- TeX Macros for Domains, *E* 20
- The .gaprc file, *R* 33
- The Adjoint Representation, *R* 651
- The Compiler, *R* 35
- The Defining Attributes of Rational Functions, *R* 688
- The Dixon-Schneider Algorithm, *R* 753
- The Documentation, *R* 835
- The External Representation for Associative Words, *R* 338
- The family pcgs, *R* 453
- The Files of a GAP Package, *E* 35
- The GAP System, *T* 10
- The GASMAN Interface for Weak Pointer Objects, *E* 53
- The General Backtrack Algorithm with Ordered Partitions, *E* 55
- The Help Book Handler, *E* 43
- The Info Mechanism, *T* 85
- The Interface between Character Tables and Groups, *R* 730
- The Interface between Tables of Marks and Character Tables, *R* 720
- The Library of Tables of Marks, *R* 723
- The Main File, *E* 11
- The manual.six File, *E* 43
- then**, *R* 51
- The Natural Action, *R* 415
- The PackageInfo.g File, *E* 37
- The Pager Command, *R* 25
- The Permutation Image of an Action, *R* 402
- The Representations of Rational Functions, *R* 687
- The Smash MeatAxe, *R* 700
- The Syntax in BNF, *R* 59
- The WWW Homepage of a Package, *E* 37
- ThreeGroup** library, *R* 520
- Tietze Options, *R* 502
- Tietze Transformations, *R* 489
- Tietze Transformations that introduce new Generators, *R* 494
- TietzeWordAbstractWord**, *R* 487
- time**, *R* 82
- Timing, *R* 81
- Todd-Coxeter Procedure, *R* 553
- Trace**, *R* 226
  - for field elements, *R* 581
  - of a matrix, *R* 226
- TracedCosetFpGroup**, *R* 467
- TraceImmediateMethods**, *R* 79
- TraceMat**, *R* 226
- TraceMethods**, *R* 79, *T* 75
- TracePolynomial**, *R* 580
- Tracing generator images through Tietze transformations, *R* 497
- Tracing Methods, *R* 79
- TransferDiagram**, *R* 814
- Transformation**, *R* 554
- TransformationData**, *R* 554
- TransformationFamily**, *R* 554
- TransformationNC**, *R* 554
- TransformationRelation**, *R* 556

- TransformationType, R 554
- TransformingPermutations, R 763
- TransformingPermutationsCharacterTables, R 764
- transitive, R 406
- TransitiveClosureBinaryRelation, R 316
- TransitiveGroup, R 518
- TransitiveIdentification, R 518
- Transitive Permutation Groups, *R 518*
- transitive relation, R 315
- Transitivity, for characters, R 779
  - for class functions, R 779
  - for group actions, R 406
- TranslatorSubalgebra, R 638
- transporter, R 402
- TransposedMat, R 227
- TransposedMatAttr, R 227
- TransposedMatDestructive, R 228
- TransposedMatImmutable, R 227
- TransposedMatMutable, R 227
- TransposedMatOp, R 227
- TransposedMatrixGroup, R 429
- Transversal, N 19
- TransversalBySiftFunction, N 18
- TransversalByTrivial, N 18
- TransversalElt, N 16
- TransversalOfChainSubgroup, N 20
- Transversals, *R 357*
- Transversals by direct products, *N 18*
- Transversals by homomorphic images, *N 17*
- Transversals by Schreier tree, *N 16*
- Transversals by sift functions, *N 18*
- Transversals by Trivial subgroups, *N 18*
- Triangular Matrices, *R 234*
- TriangulizedIntegerMat, R 241
- TriangulizedIntegerMatTransform, R 241
- TriangulizedNullspaceMat, R 229
- TriangulizedNullspaceMatDestructive, R 229
- TriangulizeIntegerMat, R 241
- TriangulizeMat, R 229
- Trivial chain subgroups and sift function chain subgroups, *N 21*
- TrivialCharacter, R 775
- TrivialGroup, R 510
- TrivialIterator, R 279
- TrivialSubalgebra, R 620
- TrivialSubgroup, R 362
- TrivialSubmagmaWithOne, R 324
- TrivialSubmodule, R 574
- TrivialSubmonoid, R 545
- TrivialSubnearAdditiveMagmaWithZero, R 559
- TrivialSubspace, R 599
- TryCosetTableInWholeGroup, R 470
- TryGcdCancelExtRepPolynomials, R 690
- TryNextMethod, P 13, T 74
- Tuples, R 151
- tuple stabilizer, R 401
- TwoClosure, R 426
- TwoCoboundaries, R 458
- TwoCocycles, R 458
- TwoCohomology, R 458
- TwoGroup library, R 520
- TwoSidedIdeal, R 563
- TwoSidedIdealByGenerators, R 564
- TwoSidedIdealNC, R 564
- TwoSquares, R 144
- type, boolean, R 169
  - cyclotomic, R 157
  - records, R 261
  - strings, R 249
- TypeObj, R 125
- TypeOfDefaultGeneralMapping, R 313
- Types, *R 125*
- TzEliminate, R 492
- TzFindCyclicJoins, R 493
- TzGo, R 490
- TzGoGo, R 491
- TzImagesOldGens, R 498
- TzInitGeneratorImages, R 497
- TzNewGenerator, R 489
- TzOptions, R 502
- TzPreImagesNewGens, R 498
- TzPrint, R 488
- TzPrintGeneratorImages, R 498
- TzPrintGenerators, R 487
- TzPrintLengths, R 488
- TzPrintOptions, R 503
- TzPrintPairs, R 488
- TzPrintPresentation, R 488
- TzPrintRelators, R 487
- TzPrintStatus, R 488
- TzSearch, R 492
- TzSearchEqual, R 493
- TzSort, R 481
- TzSubstitute, R 494
- TzSubstituteCyclicJoins, R 497

**U**

- $u_N$ , R 162
- UglyVector, R 612
- Umlauts, *E 26*
- Unbind, R 44
  - for lists, R 178
- UnbindElmWPObj, E 52
- UnbindGlobal, R 45
- UnderlyingCharacteristic, R 737
- UnderlyingCharacterTable, R 769
- UnderlyingElement, fp group elements, R 465
  - fp semigroup elements, R 551
- UnderlyingElementOfReesMatrixSemigroup-Element, R 544
- UnderlyingElementOfReesZeroMatrixSemigroup-Element, R 544
- UnderlyingExternalSet, R 410
- UnderlyingFamily, R 640
- UnderlyingGeneralMapping, R 306
- UnderlyingGroup, for character tables, R 731
  - for tables of marks, R 709
- UnderlyingLeftModule, R 602
- UnderlyingLieAlgebra, R 646
- UnderlyingMagma, R 663
- UnderlyingRelation, R 306
- Undocumented Variables, *E 33*
- UnInstallCharReadHookFunc, R 106
- Union, R 275
  - union, of collections, R 275
    - of sets, R 197
- Union2, R 275
- UnionBlist, R 211
- Unique, R 199
- UniteBlist, R 212
- UniteBlistList, R 212
- UniteSet, R 197
- Units, R 567
- Units and Factorizations, *R 567*
- UnivariatenessTestRationalFunction, R 674
- UnivariatePolynomial, R 673
- UnivariatePolynomialByCoefficients, R 673
- UnivariatePolynomialRing, R 682
- Univariate Polynomial Rings, *R 682*
- Univariate Polynomials, *R 673*
- UnivariateRationalFunctionByCoefficients, R 679
- Univariate Rational Functions, *R 679*
- UniversalEnvelopingAlgebra, R 652
- Universal Enveloping Algebras, *R 652*
- UNIX, features, R 27
  - options, R 27
- UNIXSelect, R 98
- Unknown, R 167
- UnloadSmallGroupsData, R 521
- UnorderedTuples, R 150
- Unpacking, *R 831*
- UnprofileFunctions, R 83
- UnprofileMethods, R 83
- until, R 52
- UntraceMethods, R 79
- UpdateMap, R 812
- UpEnv, R 71
- UpperCentralSeriesOfGroup, R 371
- UpperSubdiagonal, R 234
- Usage of the Percent Symbol, *E 24*
- UseBasis, R 576
- UseFactorRelation, R 297
- Useful Categories for all Elements of a Family, *R 301*
- Useful Categories of Elements, *R 299*
- UseIsomorphismRelation, R 297
- User Streams, *R 103*
- UseSubsetRelation, R 297
- Using buildman.pe, *E 27*
- utilities for editing GAP files, R 75

**V**

- V, (global) Variable mark-up, E 16
- $v_N$ , R 162
- Valuation, R 693
- Value, R 676
- ValueCochain, R 655
- ValueGlobal, R 45
- ValueMolienSeries, R 792
- ValueOption, R 89
- ValuePol, R 220
- ValuesOfClassFunction, R 769
- Variable Access in a Break Loop, *R 71*
- Variables, *R 43*
- variables, T 22
- vectors, row, T 36
- Vectors and Matrices, *T 36*
- Vectors as coefficients of polynomials, *R 219*
- VectorSpace, R 598
- VectorSpaceByPcgsOfElementaryAbelianGroup, R 449
- Vector Space Homomorphisms, *R 609*

Vector Spaces, *T* 59  
 Vector Spaces Handled By Nice Bases, *R* 611  
 verbatim environments, *E* 22  
 Version Numbers, *E* 40  
 vi, *R* 75  
 View, *R* 66  
 View and Print, *R* 66  
 ViewObj, *R* 67  
     for character tables, *R* 747  
     for class functions, *R* 773  
     for tables of marks, *R* 705  
 vim, *R* 75  
 VirtualCharacter, *R* 774  
 virtual character, *R* 776  
 virtual characters, *R* 767  
**W**  
 $w_N$ , *R* 162  
 WeakPointerObj, *E* 51  
 WeakPointerObj, *E* 51  
 Weak Pointer Objects, *E* 51  
 web sites, for GAP, *T* 16  
 WedgeGModule, *R* 696  
 WeekDay, *R* 259  
 WeightLexOrdering, *R* 283  
 WeightOfGenerators, *R* 284  
 WeightsTom, *R* 711  
 WeightVecFFE, *R* 219  
 WeylGroup, *R* 648  
 WeylOrbitIterator, *R* 649  
 Where, *R* 70, *T* 86  
 While, *R* 52  
 while loop, *R* 52  
 whitespace, *T* 19  
 Whitespaces, *R* 41  
 Why Class Functions?, *R* 767  
 Why Proceed in a Different Way?, *P* 46  
 WordAlp, *R* 254  
 words, in generators, *R* 353  
 Working with large degree permutation groups,  
     *R* 427

Wrapping Up a GAP Package, *E* 41  
 WreathProduct, *R* 507  
 wreath product embedding, *R* 508  
 WreathProductImprimitiveAction, *R* 508  
 WreathProductOrdering, *R* 285  
 WreathProductProductAction, *R* 508  
 Wreath Products, *R* 507  
 WriteAll, *R* 101  
 WriteByte, *R* 101  
 WriteLine, *R* 101  
 Writing Documentation, *E* 36  
 Writing Functions, *T* 40

**X**

$x$ , *T* 79  
 $x_N$ , *R* 162

**Y**

$y_N$ , *R* 162

**Z**

$z$ , *R* 583  
 ZClassRepsQClass, *R* 433  
 Zero, *R* 293  
 ZeroAttr, *R* 293  
 ZeroCoefficient, *R* 664  
 ZeroCoefficientRatFun, *R* 688  
 ZeroImmutable, *R* 293  
 ZeroMapping, *R* 305  
 ZeroMutable, *R* 293  
 ZeroOp, *R* 293  
 ZeroSameMutability, *R* 293  
 ZeroSM, *R* 293  
 ZippedProduct, *R* 690  
 ZippedSum, *R* 690  
 ZmodnZ, *R* 135  
 ZmodnZObj, *R* 135  
 ZmodpZ, *R* 135  
 ZmodpZNC, *R* 135  
 zoo, *E* 41  
 ZumbroichBase, *R* 594  
 Zuppos, *R* 376