



Precalculus Math Skills

Here is a list of all of Precalculus Math Skills.

A. Functions

1. 1
Domain and range
2. 2
Identify functions
3. 3
Evaluate functions
4. 4
Find values using function graphs
5. 5
Complete a table for a function graph
6. 6
Find the slope of a linear function
7. 7
Graph a linear function
8. 8
Write the equation of a linear function
9. 9
Linear functions over unit intervals

10.10

Average rate of change

11.11

Add, subtract, multiply, and divide functions

12.12

Composition of functions

13.13

Identify inverse functions

14.14

Find values of inverse functions from tables

15.15

Find values of inverse functions from graphs

16.16

Find inverse functions and relations

B. Families of functions

1. 1

Function transformation rules

2. 2

Translations of functions

3. 3

Reflections of functions

4. 4

Dilations of functions

5. 5

Transformations of functions

6. 6

Describe function transformations

C. Quadratic functions

1. 1

Find the maximum or minimum value of a quadratic function

2. 2

Characteristics of quadratic functions

3. 3

Graph a quadratic function

4. 4

Match quadratic functions and graphs

5. 5

Solve a quadratic equation using square roots

6. 6

Solve a quadratic equation by factoring

7. 7

Solve a quadratic equation by completing the square

8. 8

Solve a quadratic equation using the quadratic formula

9. 9

Using the discriminant

D. Polynomials

1. 1
Divide polynomials using long division
2. 2
Divide polynomials using synthetic division
3. 3
Evaluate polynomials using synthetic division
4. 4
Find the roots of factored polynomials
5. 5
Write a polynomial from its roots
6. 6
Rational root theorem
7. 7
Complex conjugate theorem
8. 8
Conjugate root theorems
9. 9
Descartes' Rule of Signs
10. 10
Fundamental Theorem of Algebra
11. 11
Match polynomials and graphs
12. 12
Domain and range of polynomials

13.13

Factor sums and differences of cubes

14.14

Solve equations with sums and differences of cubes

15.15

Factor using a quadratic pattern

16.16

Solve equations using a quadratic pattern

17.17

Pascal's triangle

18.18

Pascal's triangle and the Binomial Theorem

19.19

Binomial Theorem I

20.20

Binomial Theorem II

E. Rational functions

1. 1

Rational functions: asymptotes and excluded values

2. 2

Solve rational equations

3. 3

Check whether two rational functions are inverses

F. Exponential and logarithmic functions

1. 1
Domain and range of exponential and logarithmic functions
2. 2
Convert between exponential and logarithmic form
3. 3
Solve exponential equations using factoring
4. 4
Evaluate logarithms
5. 5
Change of base formula
6. 6
Product property of logarithms
7. 7
Quotient property of logarithms
8. 8
Power property of logarithms
9. 9
Evaluate logarithms using properties
10. 10
Solve exponential equations using logarithms
11. 11
Solve logarithmic equations with one logarithm
12. 12
Solve logarithmic equations with multiple logarithms

13.13

Exponential functions over unit intervals

14.14

Identify linear and exponential functions

15.15

Describe linear and exponential growth and decay

16.16

Exponential growth and decay: word problems

17.17

Compound interest: word problems

G. Radical functions

1. 1

Domain and range of radical functions

2. 2

Solve radical equations

H. Roots and rational exponents

1. 1

Roots of integers

2. 2

Roots of rational numbers

3. 3

Find roots using a calculator

4. 4

Evaluate rational exponents

5. 5

Operations with rational exponents

6. 6
Simplify radical expressions with variables

7. 7
Nth roots

8. 8
Simplify expressions involving rational exponents

I. Systems of equations

1. 1
Solve a system of equations by graphing

2. 2
Solve a system of equations by graphing: word problems

3. 3
Classify a system of equations

4. 4
Solve a system of equations using substitution

5. 5
Solve a system of equations using substitution: word problems

6. 6
Solve a system of equations using elimination

7. 7
Solve a system of equations using elimination: word problems

8. 8
Solve a system of equations in three variables using substitution

9. 9
Solve a system of equations in three variables using elimination

10.10

Determine the number of solutions to a system of equations in three variables

J. Systems of inequalities

1. 1

Solve systems of linear inequalities by graphing

2. 2

Solve systems of linear and absolute value inequalities by graphing

3. 3

Find the vertices of a solution set

4. 4

Linear programming

K. Nonlinear inequalities

1. 1

Graph solutions to quadratic inequalities

2. 2

Solve quadratic inequalities

3. 3

Graph solutions to higher-degree inequalities

4. 4

Solve higher-degree inequalities

L. Matrices

1. 1

Matrix vocabulary

2. 2

Matrix operation rules

- 3. 3
Add and subtract matrices
- 4. 4
Multiply a matrix by a scalar
- 5. 5
Add and subtract scalar multiples of matrices
- 6. 6
Multiply two matrices
- 7. 7
Simplify matrix expressions
- 8. 8
Properties of matrices
- 9. 9
Solve matrix equations
- 10. 10
Determinant of a matrix
- 11. 11
Is a matrix invertible?
- 12. 12
Inverse of a 2×2 matrix
- 13. 13
Inverse of a 3×3 matrix
- 14. 14
Identify inverse matrices
- 15. 15
Solve matrix equations using inverses

16.16

Identify transformation matrices

17.17

Transformation matrices: write the vertex matrix

18.18

Transformation matrices: graph the image

M. Trigonometry

1. 1

Convert between radians and degrees

2. 2

Radians and arc length

3. 3

Quadrants

4. 4

Coterminal and reference angles

5. 5

Find trigonometric ratios using right triangles

6. 6

Find trigonometric ratios using the unit circle

7. 7

Find trigonometric ratios using reference angles

8. 8

Inverses of trigonometric functions

9. 9

Solve trigonometric equations

10.10

Trigonometric ratios: find a side length

11.11

Trigonometric ratios: find an angle measure

12.12

Solve a right triangle

13.13

Law of Sines

14.14

Law of Cosines

15.15

Solve a triangle

16.16

Area of a triangle: sine formula

17.17

Area of a triangle: Heron's formula

N. Trigonometric functions

1. 1

Find properties of sine functions

2. 2

Write equations of sine functions from graphs

3. 3

Write equations of sine functions using properties

4. 4

Graph sine functions

5. 5

Graph translations of sine functions

6. 6

Find properties of cosine functions

7. 7

Write equations of cosine functions from graphs

8. 8

Write equations of cosine functions using properties

9. 9

Graph cosine functions

10.10

Graph translations of cosine functions

11.11

Graph sine and cosine functions

12.12

Graph translations of sine and cosine functions

O. Trigonometric identities

1. 1

Complementary angle identities

2. 2

Symmetry and periodicity of trigonometric functions

3. 3

Trigonometric identities I

4. 4

Trigonometric identities II

P. Conic sections

1. 1
Find properties of parabolas
2. 2
Write equations of parabolas in vertex form
3. 3
Graph parabolas
4. 4
Find properties of circles
5. 5
Write equations of circles in standard form
6. 6
Graph circles
7. 7
Find properties of ellipses
8. 8
Find the eccentricity of an ellipse
9. 9
Write equations of ellipses in standard form
10. 10
Find properties of hyperbolas
11. 11
Find the eccentricity of a hyperbola
12. 12
Write equations of hyperbolas in standard form

13.13

Convert equations of conic sections from general to standard form

Q. Real numbers

1. 1

Sort rational and irrational numbers

2. 2

Classify rational and irrational numbers

3. 3

Properties of operations on rational and irrational numbers

R. Complex numbers

1. 1

Add and subtract complex numbers

2. 2

Complex conjugates

3. 3

Multiply and divide complex numbers

4. 4

Add, subtract, multiply, and divide complex numbers

5. 5

Absolute values of complex numbers

6. 6

Powers of i

S. Complex plane

1. 1
Introduction to the complex plane
2. 2
Graph complex numbers
3. 3
Addition in the complex plane
4. 4
Subtraction in the complex plane
5. 5
Graph complex conjugates
6. 6
Absolute value in the complex plane
7. 7
Midpoints in the complex plane
8. 8
Distance in the complex plane

T. Polar form

1. 1
Find the modulus and argument of a complex number
2. 2
Convert complex numbers from rectangular to polar form
3. 3
Convert complex numbers from polar to rectangular form

4. 4
Convert complex numbers between rectangular and polar form

5. 5
Match polar equations and graphs

U. Two-dimensional vectors

1. 1
Find the magnitude of a vector

2. 2
Find the component form of a vector

3. 3
Find the direction angle of a vector

4. 4
Find the component form of a vector from its magnitude and direction angle

5. 5
Graph a resultant vector using the triangle method

6. 6
Graph a resultant vector using the parallelogram method

7. 7
Add vectors

8. 8
Subtract vectors

9. 9
Find the magnitude and direction of a vector sum

10. 10
Multiply a vector by a scalar

11.11

Find the magnitude of a vector scalar multiple

12.12

Determine the direction of a vector scalar multiple

13.13

Find a unit vector

14.14

Linear combinations of vectors

V. Three-dimensional vectors

1. 1

Find the magnitude of a three-dimensional vector

2. 2

Find the component form of a three-dimensional vector

3. 3

Add and subtract three-dimensional vectors

4. 4

Scalar multiples of three-dimensional vectors

5. 5

Find a three-dimensional unit vector

6. 6

Linear combinations of three-dimensional vectors

W. Sequences and series

1. 1
Find terms of a sequence
2. 2
Find terms of a recursive sequence
3. 3
Identify a sequence as explicit or recursive
4. 4
Find a recursive formula
5. 5
Find recursive and explicit formulas
6. 6
Convert a recursive formula to an explicit formula
7. 7
Convert an explicit formula to a recursive formula
8. 8
Convert between explicit and recursive formulas
9. 9
Identify arithmetic and geometric series
10. 10
Introduction to sigma notation
11. 11
Find the sum of an arithmetic series
12. 12
Find the sum of a finite geometric series

13.13

Introduction to partial sums

14.14

Partial sums of arithmetic series

15.15

Partial sums of geometric series

16.16

Partial sums: mixed review

17.17

Convergent and divergent geometric series

18.18

Find the value of an infinite geometric series

19.19

Write a repeating decimal as a fraction

X. Probability

1. 1

Introduction to probability

2. 2

Calculate probabilities of events

3. 3

Combinations and permutations

4. 4

Find probabilities using combinations and permutations

5. 5

Find probabilities using two-way frequency tables

6. 6

Identify independent events

7. 7

Find conditional probabilities

8. 8

Independence and conditional probability

9. 9

Find conditional probabilities using two-way frequency tables

10.10

Find probabilities using the addition rule

Y. Probability distributions

1. 1

Identify discrete and continuous random variables

2. 2

Write a discrete probability distribution

3. 3

Graph a discrete probability distribution

4. 4

Expected values of random variables

5. 5

Variance of random variables

6. 6

Standard deviation of random variables

7. 7

Write the probability distribution for a game of chance

8. 8

Expected values for a game of chance

9. 9

Choose the better bet

10.10

Find probabilities using the binomial distribution

11.11

Mean, variance, and standard deviation of binomial distributions

12.12

Find probabilities using the normal distribution I

13.13

Find probabilities using the normal distribution II

14.14

Find z-values

15.15

Find values of normal variables

16.16

Distributions of sample means

17.17

The Central Limit Theorem

18.18

Use normal distributions to approximate binomial distributions

Z. Statistics

1. 1
Identify biased samples
2. 2
Variance and standard deviation
3. 3
Identify an outlier
4. 4
Identify an outlier and describe the effect of removing it
5. 5
Outliers in scatter plots
6. 6
Match correlation coefficients to scatter plots
7. 7
Calculate correlation coefficients
8. 8
Find the equation of a regression line
9. 9
Interpret regression lines
10. 10
Analyze a regression line of a data set
11. 11
Analyze a regression line using statistics of a data set
12. 12
Find confidence intervals for population means

13.13

Find confidence intervals for population proportions

14.14

Interpret confidence intervals for population means

15.15

Experiment design

16.16

Analyze the results of an experiment using simulations