

# Algebra 2 Math Skills

Here is a list of all of Algebra 2 Math Skills.

## A. Variable expressions

1. 1  
Evaluate variable expressions involving integers
2. 2  
Evaluate variable expressions involving rational numbers
3. 3  
Simplify variable expressions using properties
4. 4  
Sort factors of single-variable expressions
5. 5  
Sort factors of multi-variable expressions

## B. Equations

1. 1  
Solve linear equations
2. 2  
Solve linear equations: word problems
3. 3  
Solve equations: complete the solution

4. 4

Solve absolute value equations

5. 5

Graph solutions to absolute value equations

6. 6

Solve multi-variable equations

## C. Inequalities

1. 1

Graph a linear inequality in one variable

2. 2

Write inequalities from graphs

3. 3

Write a linear inequality: word problems

4. 4

Solve linear inequalities

5. 5

Graph solutions to linear inequalities

6. 6

Solve absolute value inequalities

7. 7

Graph solutions to absolute value inequalities

8. 8

Graph a two-variable linear inequality

9. 9

Graph solutions to two-variable absolute value inequalities

10.10

Graph solutions to quadratic inequalities

11.11

Solve quadratic inequalities

## **D. 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

Graph an absolute value function

12.12

Domain and range of absolute value functions: graphs

13.13

Domain and range of absolute value functions: equations

14.14

Transformations of absolute value functions

## **E. Systems of equations**

1. 1

Is  $(x, y)$  a solution to the system of equations?

2. 2

Solve a system of equations by graphing

3. 3

Solve a system of equations by graphing: word problems

4. 4

Find the number of solutions to a system of equations

5. 5

Classify a system of equations

6. 6

Solve a system of equations using substitution

7. 7

Solve a system of equations using substitution: word problems

8. 8

Solve a system of equations using elimination

9. 9

Solve a system of equations using elimination: word problems

10.10

Solve a system of equations using any method

11.11

Solve a system of equations using any method: word problems

12.12

Solve a system of equations in three variables using substitution

13.13

Solve a system of equations in three variables using elimination

14.14

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

15.15

Solve a system of linear and quadratic equations

16.16

Solve a non-linear system of equations

## **F. Systems of inequalities**

1. 1

Is  $(x, y)$  a solution to the system of inequalities?

2. 2

Solve systems of linear inequalities by graphing

3. 3

Solve systems of linear and absolute value inequalities by graphing

4. 4

Find the vertices of a solution set

- 5. 5  
Linear programming

## **G. 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 matrix

13.13

Identify inverse matrices

14.14

Solve matrix equations using inverses

15.15

Identify transformation matrices

16.16

Transformation matrices: write the vertex matrix

17.17

Transformation matrices: graph the image

18.18

Solve a system of equations using augmented matrices

19.19

Solve a system of equations using augmented matrices: word problems

## **H. Complex numbers**

1. 1

Introduction to complex numbers

2. 2

Add and subtract complex numbers

3. 3

Complex conjugates

4. 4

Multiply complex numbers

5. 5  
Divide complex numbers
6. 6  
Add, subtract, multiply, and divide complex numbers
7. 7  
Absolute values of complex numbers
8. 8  
Powers of  $i$

## I. Factoring

1. 1  
Factor out a monomial
2. 2  
Factor quadratics using algebra tiles
3. 3  
Factor quadratics
4. 4  
Factor using a quadratic pattern
5. 5  
Factor by grouping
6. 6  
Factor sums and differences of cubes
7. 7  
Factor polynomials



## J. Quadratic functions

1. 1  
Characteristics of quadratic functions: graphs
2. 2  
Characteristics of quadratic functions: equations
3. 3  
Complete a function table: quadratic functions
4. 4  
Transformations of quadratic functions
5. 5  
Graph a quadratic function
6. 6  
Solve a quadratic equation using square roots
7. 7  
Solve a quadratic equation using the zero product property
8. 8  
Solve a quadratic equation by factoring
9. 9  
Complete the square
10. 10  
Solve a quadratic equation by completing the square
11. 11  
Solve a quadratic equation using the quadratic formula
12. 12  
Using the discriminant

13. 13

Match quadratic functions and graphs

14. 14

Write a quadratic function from its zeros

15. 15

Write a quadratic function from its vertex and another point

## **K. Polynomials**

1. 1

Polynomial vocabulary

2. 2

Add and subtract polynomials

3. 3

Multiply polynomials

4. 4

Divide polynomials using long division

5. 5

Divide polynomials using synthetic division

6. 6

Evaluate polynomials using synthetic division

7. 7

Solve polynomial equations

8. 8

Find the roots of factored polynomials

9. 9

Write a polynomial from its roots

10.10

Rational root theorem

11.11

Complex conjugate theorem

12.12

Conjugate root theorems

13.13

Descartes' Rule of Signs

14.14

Match polynomials and graphs

15.15

Domain and range of polynomials

16.16

Fundamental Theorem of Algebra

17.17

Pascal's triangle

18.18

Pascal's triangle and the Binomial Theorem

19.19

Binomial Theorem I

20.20

Binomial Theorem II

## L. Radical functions and expressions

1. 1  
Roots of integers
2. 2  
Roots of rational numbers
3. 3  
Find roots using a calculator
4. 4  
Simplify radical expressions with variables I
5. 5  
Simplify radical expressions with variables II
6. 6  
Nth roots
7. 7  
Multiply radical expressions
8. 8  
Divide radical expressions
9. 9  
Add and subtract radical expressions
10. 10  
Simplify radical expressions using the distributive property
11. 11  
Simplify radical expressions using conjugates
12. 12  
Domain and range of radical functions

13.13

Solve radical equations

## **M. Rational exponents**

1. 1

Evaluate rational exponents

2. 2

Multiplication with rational exponents

3. 3

Division with rational exponents

4. 4

Power rule

5. 5

Simplify expressions involving rational exponents I

6. 6

Simplify expressions involving rational exponents II

## **N. Rational functions and expressions**

1. 1

Rational functions: asymptotes and excluded values

2. 2

Evaluate rational expressions I

3. 3

Evaluate rational expressions II

4. 4

Simplify rational expressions

5. 5

Multiply and divide rational expressions

6. 6

Add and subtract rational expressions

7. 7

Solve rational equations

## **O. Function operations**

1. 1

Add and subtract functions

2. 2

Multiply functions

3. 3

Divide functions

4. 4

Composition of linear functions: find a value

5. 5

Composition of linear functions: find an equation

6. 6

Composition of linear and quadratic functions: find a value

7. 7

Composition of linear and quadratic functions: find an equation

8. 8

Identify inverse functions

9. 9

Find values of inverse functions from tables

10. 10

Find values of inverse functions from graphs

11.11

Find inverse functions and relations

## **P. 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

## **Q. Variation**

1. 1

Write and solve direct variation equations

2. 2

Write and solve inverse variation equations

3. 3

Classify variation

4. 4

Write joint and combined variation equations I

5. 5

Find the constant of variation

6. 6

Write joint and combined variation equations II

7. 7

Solve variation equations

## R. Logarithms

1. 1

Convert between exponential and logarithmic form: rational bases

2. 2

Convert between natural exponential and logarithmic form

3. 3

Convert between exponential and logarithmic form: all bases

4. 4

Evaluate logarithms

5. 5

Evaluate natural logarithms

6. 6

Change of base formula

7. 7

Evaluate logarithms using a calculator

8. 8

Identify properties of logarithms

9. 9

Product property of logarithms

10. 10

Quotient property of logarithms



11.11

Power property of logarithms

12.12

Properties of logarithms: mixed review

13.13

Evaluate logarithms using properties

## **S. Exponential and logarithmic functions**

1. 1

Domain and range of exponential and logarithmic functions

2. 2

Evaluate exponential functions

3. 3

Match exponential functions and graphs

4. 4

Solve exponential equations using factoring

5. 5

Solve exponential equations using common logarithms

6. 6

Solve exponential equations using natural logarithms

7. 7

Solve logarithmic equations I

8. 8

Solve logarithmic equations II

9. 9

Exponential functions over unit intervals

10.10

Identify linear and exponential functions

11.11

Describe linear and exponential growth and decay

12.12

Exponential growth and decay: word problems

13.13

Compound interest: word problems

14.14

Continuously compounded interest: word problems

## **T. Parabolas**

1. 1

Identify the direction a parabola opens

2. 2

Find the vertex of a parabola

3. 3

Find the focus or directrix of a parabola

4. 4

Find the axis of symmetry of a parabola

5. 5

Write equations of parabolas in vertex form from graphs

6. 6

Write equations of parabolas in vertex form using properties

7. 7

Convert equations of parabolas from general to vertex form

8. 8

Find properties of a parabola from equations in general form

9. 9

Graph parabolas

## U. Circles

1. 1

Find the center of a circle

2. 2

Find the radius or diameter of a circle

3. 3

Write equations of circles in standard form from graphs

4. 4

Write equations of circles in standard form using properties

5. 5

Convert equations of circles from general to standard form

6. 6

Find properties of circles from equations in general form

7. 7

Graph circles

## V. Ellipses

1. 1

Find the center, vertices, or co-vertices of an ellipse

2. 2

Find the length of the major or minor axes of an ellipse

3. 3

Find the foci of an ellipse

4. 4  
Write equations of ellipses in standard form from graphs
5. 5  
Write equations of ellipses in standard form using properties
6. 6  
Convert equations of ellipses from general to standard form
7. 7  
Find properties of ellipses from equations in general form

## **W.Hyperbolas**

1. 1  
Find the center of a hyperbola
2. 2  
Find the vertices of a hyperbola
3. 3  
Find the length of the transverse or conjugate axes of a hyperbola
4. 4  
Find the equations for the asymptotes of a hyperbola
5. 5  
Find the foci of a hyperbola
6. 6  
Write equations of hyperbolas in standard form from graphs
7. 7  
Write equations of hyperbolas in standard form using properties
8. 8  
Convert equations of hyperbolas from general to standard form

9. 9

Find properties of hyperbolas from equations in general form

## **X. Angle measures**

1. 1

Convert between radians and degrees

2. 2

Radians and arc length

3. 3

Graphs of angles

4. 4

Quadrants

5. 5

Coterminal angles

6. 6

Reference angles

## **Y. Trigonometry**

1. 1

Pythagorean Theorem and its converse

2. 2

Special right triangles

3. 3

Trigonometric ratios: sin, cos, and tan

4. 4

Trigonometric ratios: csc, sec, and cot

5. 5

Trigonometric ratios in similar right triangles

6. 6

Find trigonometric ratios using the unit circle

7. 7

Sin, cos, and tan of special angles

8. 8

Csc, sec, and cot of special angles

9. 9

Find trigonometric functions using a calculator

10. 10

Inverses of sin, cos, and tan

11. 11

Inverses of csc, sec, and cot

12. 12

Solve trigonometric equations I

13. 13

Solve trigonometric equations II

14. 14

Trigonometric ratios: find a side length

15. 15

Trigonometric ratios: find an angle measure

16. 16

Solve a right triangle

17. 17

Law of Sines

18. 18

Law of Cosines

19.19

Solve a triangle

20.20

Area of a triangle: sine formula

21.21

Area of a triangle: Law of Sines

## **Z. 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

## **AA. 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

## **BB. Sequences and series**

1. 1

Find terms of an arithmetic sequence

2. 2

Find terms of a geometric sequence

3. 3

Evaluate explicit formulas for sequences

4. 4

Evaluate recursive formulas for sequences

5. 5

Classify formulas and sequences



6. 6

Write a formula for an arithmetic sequence

7. 7

Write a formula for a geometric sequence

8. 8

Write a formula for a recursive sequence

9. 9

Sequences: mixed review

10.10

Identify arithmetic and geometric series

11.11

Introduction to sigma notation

12.12

Find the sum of an arithmetic series

13.13

Find the sum of a finite geometric series

14.14

Introduction to partial sums

15.15

Partial sums of arithmetic series

16.16

Partial sums of geometric series

17.17

Partial sums: mixed review

18.18

Convergent and divergent geometric series

19.19

Find the value of an infinite geometric series

20.20

Write a repeating decimal as a fraction

## CC. Probability

1. 1

Introduction to probability

2. 2

Calculate probabilities of events

3. 3

Counting principle

4. 4

Combinations and permutations

5. 5

Find probabilities using combinations and permutations

6. 6

Find probabilities using two-way frequency tables

7. 7

Identify independent events

8. 8

Probability of independent and dependent events

9. 9

Find conditional probabilities

10.10

Independence and conditional probability

11.11

Find conditional probabilities using two-way frequency tables

12.12

Find probabilities using the addition rule

## **DD. 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

Find probabilities using the normal distribution I

12.12

Find probabilities using the normal distribution II

13.13

Find z-values

14.14

Distributions of sample means

## **EE. 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

Find the equation of a regression line

7. 7

Interpret regression lines

8. 8

Analyze a regression line of a data set

9. 9

Find confidence intervals for population means

10.10

Find confidence intervals for population proportions

11.11

Interpret confidence intervals for population means

12.12

Experiment design

13.13

Analyze the results of an experiment using simulations