# SUMMER MATH PREP WORK FOR STUDENTS ENTERING ALGEBRA 1



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# ALGBERA 1, GEOMETRY, & ALGEBRA 2 SUMMER PREP WORK

This prep work should be completed, to the best of your ability, by the first day of school. If provided, Big Ideas and Google Classroom will have helpful resources (textbook, tutorials, etc.) to assist you with the completion of the prep work. Please note that all of the material in the prep work was covered in previous math classes; there are no excuses.

This prep work will be checked on the first day of class and will be collected on the second day of class. **The prep work will count as your first CLASSWORK grade for the year.**

The next page contains skills and mathematical ideas that you are expected to have a good understanding of in order to be successful in your next course. It is important that you are able to complete these skills both with and without a calculator. This prep work has been designed to specifically target the skills listed in order to help you become better prepared for your next course.

## Google Classroom Code: _____
    (1) Sign into your school email & go to Google Classroom (classroom.google.com).
    (2) Click the "+" in the top bar and type the code.

## Big Ideas Code: _____

Already Have a Username & Password?
    (1) Go to bigideasmath.com
    (2) Sign in using your information
    (3) Click your name in the top right
    (4) Click "Add Class" and enter code above

Need a Username & Password?
    (1) Go to bigideasmath.com
    (2) Click "New to Big Ideas Math?"
    (3) Enter the code above & create a login

# BEFORE ENTERING ALGEBRA 1, …
## YOU ARE EXPECTED TO KNOW THE SKILLS BELOW:

- **Good arithmetic skills with positive and negative numbers**
- **Knowledge of fractions**
- **Knowledge of finding factors of a number**
- **Knowledge of exponents**
- **Solving one-step equations**

## YOU ARE EXPECTED TO KNOW THE MATHEMATICAL IDEAS BELOW:

### The Number System
- Know that there are numbers that are not rational, and approximate them by rational numbers

### Expressions and Equations
- Work with radicals and integer exponents
- Understand the connections between proportional relationships, lines, and linear equations
- Analyze and solve linear equations and pairs of simultaneous linear equations

### Functions
- Define, evaluate, and compare functions
- Use functions to model relationships between quantities

### Geometry
- Understand congruence and similarity using physical models, transparencies, or geometry software
- Understand and apply the Pythagorean Theorem
- Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres

### Statistics and Probability
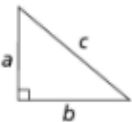- Investigate patterns of association in bivariate data

### Mathematical Practices
- Make sense of problems and persevere in solving them
- Reason abstractly and quantitatively
- Construct viable arguments and critique the reasoning of others
- Model with mathematics
- Use appropriate tools strategically
- Attend to precision
- Look for and make use of structure
- Look for and express regularity in repeated reasoning

# ALGBERA 1, GEOMETRY, & ALGEBRA 2 SUMMER PREP WORK
# REFERENCE SHEET

## Key

$b$ = base $\quad\quad$ $d$ = diameter
$h$ = height $\quad\quad$ $r$ = radius
$l$ = length $\quad\quad$ $\ell$ = slant height
$w$ = width $\quad\quad$ $B$ = area of base
$\quad\quad\quad\quad\quad$ $P$ = perimeter of base

Use 3.14 or $\frac{22}{7}$ for $\pi$.

## Formulas for Area

| | |
|---|---|
| Triangle | $A = \frac{1}{2}bh$ |
| Rectangle | $A = lw$ |
| Trapezoid | $A = \frac{1}{2}h(b_1 + b_2)$ |
| Parallelogram | $A = bh$ |
| Circle | $A = \pi r^2$ |

## Linear Equation Forms

Point–Slope Form:
$$y - y_1 = m(x - x_1)$$

Standard or General Form:
$$Ax + By = C$$

Slope–Intercept Form:
$$y = mx + b$$

## Pythagorean Theorem

$$c^2 = a^2 + b^2$$



## Coordinate Geometry

Given: Points $A(x_1, y_1)$, $B(x_2, y_2)$

Distance between two points:
$$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Midpoint between two points:
$$\text{Midpoint of } \overline{AB} = \left(\frac{x_2 + x_1}{2}, \frac{y_2 + y_1}{2}\right)$$

Slope of line through two points:
$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

## Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

## Formulas for Volume and Area of Solids

| Solid | Volume | Total Surface Area |
|---|---|---|
| Right Circular Cone | $V = \frac{1}{3}\pi r^2 h$ | $T = \frac{1}{2}(2\pi r)\ell + \pi r^2 = \pi r\ell + \pi r^2$ |
| Pyramid | $V = \frac{1}{3}Bh$ | $T = B + \frac{1}{2}P\ell$ |
| Sphere | $V = \frac{4}{3}\pi r^3$ | $T = 4\pi r^2$ |
| Right Circular Cylinder | $V = \pi r^2 h$ | $T = 2\pi rh + 2\pi r^2$ |
| Right Prism | $V = Bh$ | $T = 2B + Ph$ |

## CONVERSIONS

1 inch = 2.54 centimeters $\quad$ 1 kilometer = 0.62 mile
1 meter = 39.37 inches $\quad$ 1 pound = 16 ounces
1 mile = 5280 feet $\quad$ 1 pound = 0.454 kilograms
1 mile = 1760 yards $\quad$ 1 kilogram = 2.2 pounds
1 mile = 1.609 kilometers $\quad$ 1 ton = 2000 pounds

1 cup = 8 fluid ounces
1 pint = 2 cups
1 quart = 2 pints
1 gallon = 4 quarts
1 gallon = 3.785 liters
1 liter = 0.264 gallon
1 liter = 1000 cubic centimeters

## Additional Formulas

| | |
|---|---|
| Arithmetic Sequence | $a_n = a_1 + (n-1)d$ |
| Geometric Sequence | $a_n = a_1 r^{n-1}$ |
| Geometric Series | $S_n = \dfrac{a_1 - a_1 r^n}{1 - r}$ where $r \neq 1$ |
| Radians | $1 \text{ radian} = \dfrac{180}{\pi} \text{ degrees}$ |
| Degrees | $1 \text{ degree} = \dfrac{\pi}{180} \text{ radians}$ |
| Exponential Growth/Decay | $A = A_0 e^{k(t - t_0)} + B_0$ |

**Circumference of a Circle** $\quad C = \pi d$ or $C = 2\pi r$

Name:_____ Date:_____

Algebra 1 Summer Work

This assignment needs to be completed WITHOUT a calculator. Show all wok for each question in order to receive full credit.

| **Evaluate the expression for the given value** | |
|---|---|
| 1) $22x$, when $x = 3$ | 2) $y^2$, when $y = 15$ |
| 3) $\frac{1}{4}k$ when $k = \frac{2}{3}$ | 4) $2^n$, when $n = 5$ |
| 5) $2x + 7$ when $x = -4$ | 6) $-3x^2 + 5$ when $x = 6$ |

| **Evaluate the expression using the Order of Operations** | |
|---|---|
| 7) $32 - 5 + 9$ | 8) $15 \div (3^2 - 6)$ |
| 9) $15 \cdot 4 + 3 \cdot 6^2$ | 10) $\frac{(1+3^2)}{5}$ |

| 11) $4(2-3) \cdot 8 + 7 - 1$ | 12) $\frac{(2-3) \cdot 5}{2(3-8)}$ |
|---|---|
| | |

**Apply the distributive property**

| 13) $4(3x - 3)$ | 14) $-2(15 + 7x)$ |
|---|---|
| 15) $6(13 - 4x + y)$ | 16) $-5(-10x + 3y)$ |

**Add, subtract, multiply or divide. Simplify your answer completely**

| 17) $\frac{6}{5} - \frac{8}{5} =$ | 18) $\frac{3}{2} + \frac{7}{7} =$ |
|---|---|
| 19) $\frac{5}{7} - \frac{4}{9} =$ | 20) $\frac{8}{5} + \frac{1}{4} =$ |

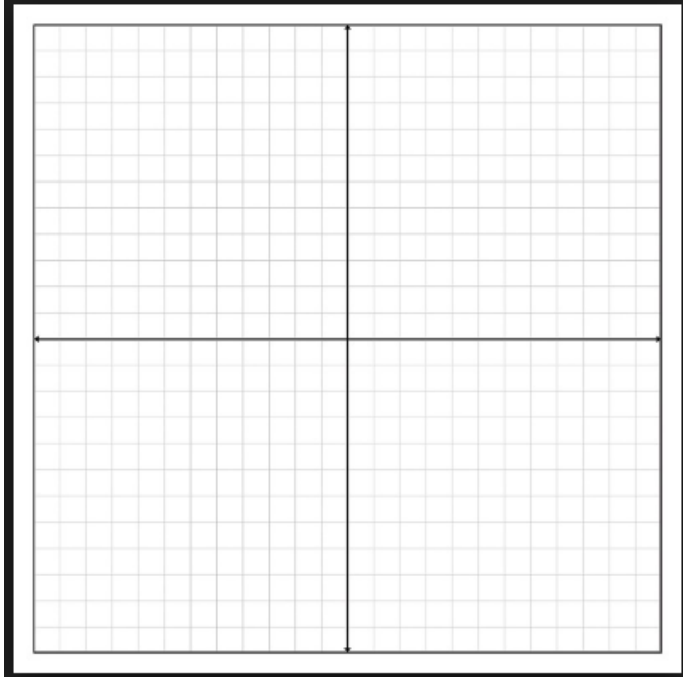| | |
|---|---|
| 21) $4\frac{3}{4} - 2\frac{1}{2} =$ | 22) $3\frac{7}{5} + 6\frac{2}{3} =$ |
| 23) $\frac{5}{7} \cdot \frac{10}{3} =$ | 24) $\frac{6}{-2} \cdot \frac{10}{19} =$ |
| 25) $\frac{-5}{7} \div \frac{3}{14} =$ | 26) $\frac{10}{27} \div \frac{4}{5} =$ |

**Plot the following points on the coordinate plane. Be sure to label each point correctly**

| | |
|---|---|
| 27) Label each quadrant | |
| 28) Label the x and y axis | |
| 29) Label the origin | |
| 30) Point A (-2,5),<br>    Point B (6,8),<br>    Point C (-3,-5),<br>    Point D(-3,-5),<br>    Point E (-3,-5) | |

**Translate the verbal phrase into an expression**

| | |
|---|---|
| 31) The product of five and a number x, minus two | 32) The quantity of 5 plus a number, times four |
| 33) Three less than the product of four and a number x, is seventeen | 34) The quantity eight plus a number x, divided by seven |

**Solve the one-step equation**

| | |
|---|---|
| 35) $x - 3 = -5$ | 36) $-6.5 = p + 3.9$ |
| 37) $\dfrac{n}{-5} = -3$ | 38) $4x = -12$ |
| 39) $p \div 5 = 3$ | 40) $-54 = 9y$ |
| 41) $-7 = \dfrac{x}{7}$ | 42) $\dfrac{3}{7}x = 6$ |

**Solve the two-step equation**

| | |
|---|---|
| 43) $-2x + 3 = 9$ | 44) $3w + 7 = 19$ |
| 45) $11 = 12 - x$ | 46) $\frac{y}{3} + 4 = 6$ |
| 47) $8x + 3y = 44$ | 48) $\frac{x+6}{5} = 2$ |
| 49) $\frac{d-8}{-2} = 12$ | 50) $5 = \frac{x}{-4} - 3$ |