

Answer Key

The summer packet for Algebra 2 Honors is to be used as a tool to review the concepts from Algebra 1 needed to move forward in Algebra 2. The student should use the problems as a measure of their knowledge and retention. The problems should be done without a calculator. Then, if needed, use the Khan Academy links as a starting point for where to find additional information to watch videos and do further problems if they do not know the indicated skill.

The summer packet and all work is due the second full day of class. (August 18th and 19th).

This packet, therefore, will be the review for the summer packet test. It will be collected, but not taken for a grade. The first full day of class (August 14th and 17th) will be used to answer questions from the summer packet. The second full day of class (August 18th and 19th) will be a **Non Calculator graded assessment** of the summer packet material.

A) Order of operations

1) $4 - 5 - 6 + 9$
 2

2) $8 \div 2 \times 6 \times (-3)$
 -72

3) $-4^2 - (-4)^2 + (6-9)^3 - [11 - (4 + |-5|)]$
 -61

For more help go here:

<https://www.khanacademy.org/math/pre-algebra/pre-algebra-arith-prop/pre-algebra-order-of-operations/v/order-of-operations>

B) Sets of Real Numbers

Describe the following set of number. List 3 examples of each.

a) Real Numbers: **A number that represents a quantity along a number line.** Ex) $7, -\frac{3}{4}, .23$

b) Rational Numbers: **A number that can be represented as the quotient of two integers**

c) Irrational Numbers: **A number that cannot be expressed as a fraction.** ex) $\sqrt{2}, \pi$

d) Natural Numbers: **Positive rational numbers with a denominator of 1.** ex) $1, 2, 3, 4, 5, \dots$

e) Whole Numbers: **Natural numbers and 0.** ex) $0, 1, 2, 3, 4 \dots$

f) Integers: **Whole numbers and their additive inverses.** ex) $\dots, -2, -1, 0, 1, 2, 3, \dots$

For more help go here:

<https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-numbers-operations/cc-8th-irrational-numbers/v/introduction-to-rational-and-irrational-numbers>

C) Set Notation

Let A = {1, 2, 3, 7, 8, 9, 10} and B = {8, 9, 10, 11, 12} and C = {4, 5, 6, 7}

1) $A \cap B$

$\{8, 9, 10\}$

2) $B \cup C$

$\{4, 5, 6, 7, 8, 9, 10, 11, 12\}$

3) $A \cup B \cup C$

$\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$

4) $A \cap B \cap C$

\emptyset

5) $A \cap C \cup B$

$\{7, 8, 9, 10, 11, 12\}$

For more help go here:

<https://www.khanacademy.org/math/statistics-probability/probability-library/basic-set-ops/v/intersection-and-union-of-sets>

D) Properties of Real numbers

Give a numeric example of each of the following properties of Addition and Multiplication.
(keyword: Use the properties themselves as keywords)

<u>Property</u>	<u>Example: Addition</u>	<u>Example: Multiplication</u>
Closure: if a and b are real # Then a +/* b is a real #		
Commutative: if a and b are real #, then a +/* b = b +/* a		
Associative: If a, b, c are real #, then a +/* (b +/* c) = (a +/* b) +/* c		
Identity: if a is a real #	$a + 0 = a$	$a * 1 = a$
Inverse: A real # plus/times its inverse = identity	$a + (-a) = 0$	$a * \frac{1}{a} = 1$

The adding of a number and its inverse is always 0.

The multiplying of a number and its inverse is always 1.

For more help go here:

<https://www.khanacademy.org/math/pre-algebra/pre-algebra-arith-prop/pre-algebra-arithmetic-properties/v/order-doesn-t-matter-when-purely-multiplying>

E) Simplifying Algebraic Expressions

Simplify the following expressions for a) $x = 3$ and $y = 2$
b) $x = -3$ and $y = \frac{1}{2}$

- | | | | | |
|-------------------|---------------------|--------------------|----------------------|----------------------|
| 1) $x^2 + 3y - 8$ | 2) $-x^2 - 8y - 11$ | 3) $3x^2 - x - 12$ | 4) $\frac{x+y}{x-y}$ | 5) $y(x+5) - (-2+x)$ |
| a) 7 | a) -36 | a) 12 | a) 5 | a) 15 |
| b) 5/2 | b) -24 | b) 18 | b) 5/7 | b) 6 |

For more help go here:

<https://www.khanacademy.org/math/algebra/introduction-to-algebra/alg1-manipulating-expressions/v/combining-like-terms>

F) Exponent Properties

1) $(5x^3)(2x^4)$

$10x^7$

2) $(-2x^5)^3$

$-8x^{15}$

3) $(-2x^5)^4$

$16x^{20}$

4) $(3x^2)^0(4x)$

$4x$

5) $\frac{4x^7}{8x^4}$

$\frac{x^3}{2}$

6) 3^{-2}

$\frac{1}{9}$

7) $\frac{12x^3y^7}{8x^5y^2}$

$\frac{3y^5}{2x^2}$

For more help go here:

<https://www.khanacademy.org/math/pre-algebra/pre-algebra-exponents-radicals#pre-algebra-exponents>

G) Radicals

Simplify. Leave answers in exact form.

1) $\sqrt{256}$

16

2) $\sqrt{-64}$

\emptyset

3) $-\sqrt{16}$

-4

4) $\sqrt{80}$

$4\sqrt{5}$

5) $6\sqrt{32}$

$24\sqrt{2}$

6) $\sqrt{5} \times \sqrt{2}$

$\sqrt{10}$

7) $3\sqrt{6} \cdot 2\sqrt{8}$

$24\sqrt{3}$

8) $(-5\sqrt{2})(3\sqrt{18})$

-90

9) $2\sqrt{5} - 8\sqrt{5}$

$-6\sqrt{5}$

10) $3\sqrt{2} + 11\sqrt{2}$

$14\sqrt{2}$

11) $-6\sqrt{75} + 2\sqrt{48}$

$-22\sqrt{3}$

12) $3\sqrt{20} + \sqrt{25}$

$6\sqrt{5} + 5$

For more help go here:

<https://www.khanacademy.org/math/algebra-home/alg-exp-and-log/miscellaneous-radicals/v/adding-and-simplifying-radicals>

<https://www.khanacademy.org/math/algebra-home/alg-exp-and-log/miscellaneous-radicals/v/subtracting-and-simplifying-radicals>

<https://www.khanacademy.org/math/algebra/rational-exponents-and-radicals/alg1-simplify-square-roots/v/simplifying-square-root-expressions>

F) Polynomials

a) Perform the indicated operation and write the answer in standard form (descending order)

b) Determine the degree of the polynomial

c) Classify the polynomial by number of terms.

1) $3x^4 + 5x^4$

$8x^4$

2) $(3x^4)(5x^4)$

$15x^8$

3) $(x^3 - 8) + (2x^3 - 5x^2 - 9)$

$3x^3 - 5x^2 - 17$

4) $(6x^2 - 8x - 5) - (7x^3 - 3x + 7)$

$-7x^3 + 6x^2 - 5x - 12$

5) $(4x^2 + 7x - 10) - (-x^2 + 8x - 5)$

$5x^2 - x - 5$

6) $2(3x + 5) - 6(x - 2)$

22

7) $(x + 5)(x + 2)$

$x^2 + 7x + 10$

8) $(4x - 5)(6x + 1)$

$24x^2 - 26x - 5$

9) $(x + 8)(x - 8)$

$x^2 - 64$

10) $(3x + 7)(3x - 7)$

$9x^2 - 49$

11) $(x + 5)^2$

$x^2 + 10x + 25$

12) $(3x - 8)^2$

$9x^2 - 48x + 64$

For more help go here:

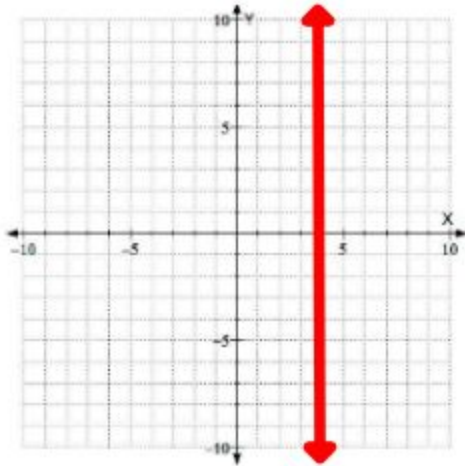
<https://www.khanacademy.org/math/algebra/introduction-to-polynomial-expressions>

<https://www.khanacademy.org/math/algebra/introduction-to-polynomial-expressions/introduction-to-polynomials/v/terms-coefficients-and-exponents-in-a-polynomial>

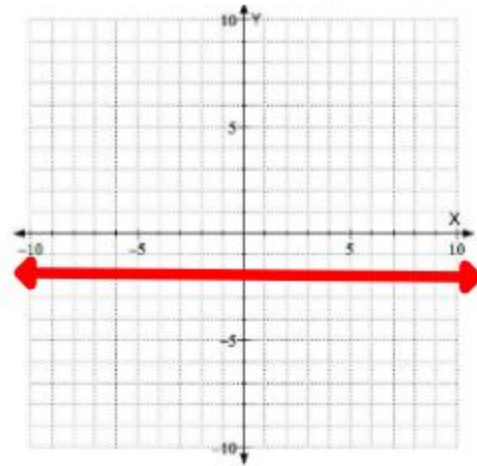
G) Graphing Lines

Graph:

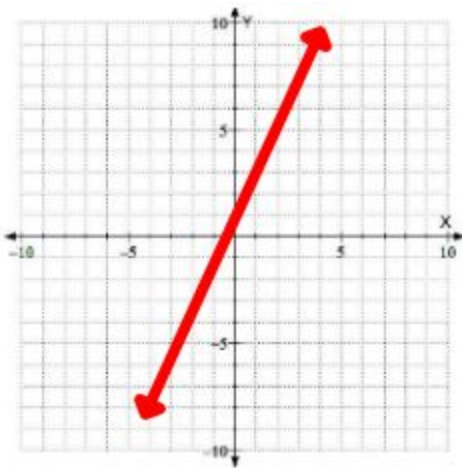
1) $x = 4$



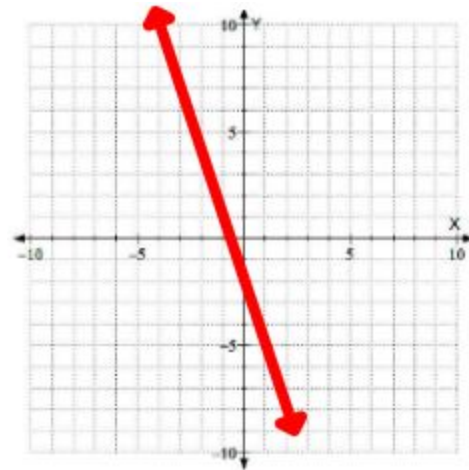
2) $y = -2$



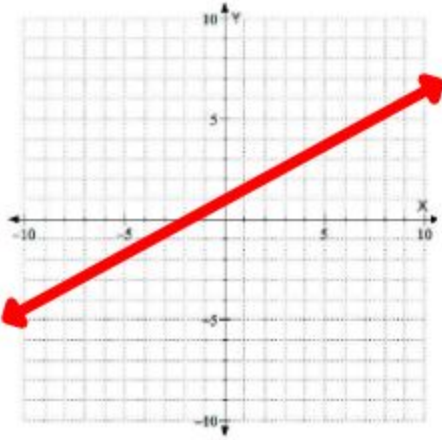
3) $y = 2x + 1$



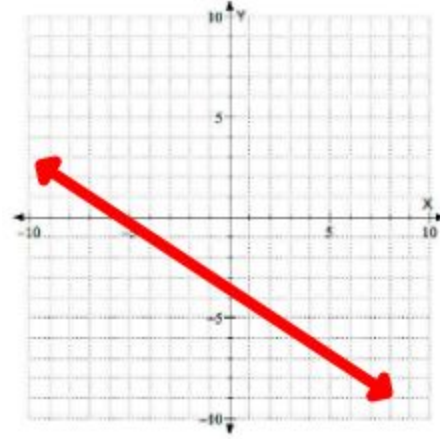
4) $y = -3x - 2$



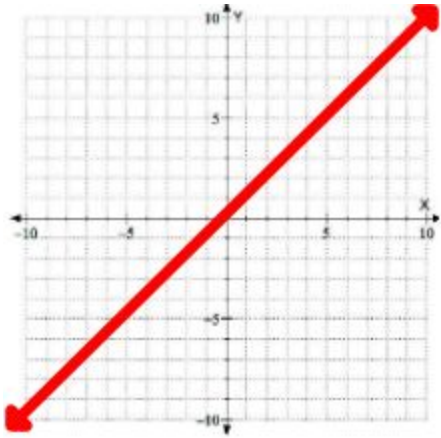
5) $y = \frac{3}{5}x + 1$



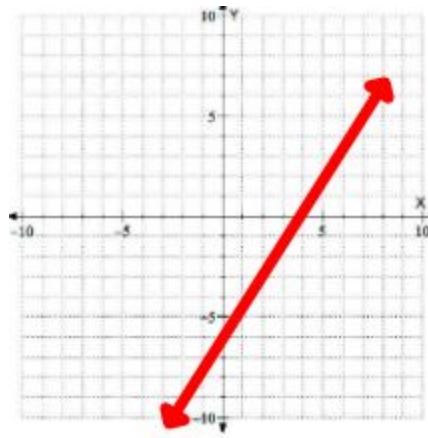
6) $y = -\frac{2}{3}x - 4$



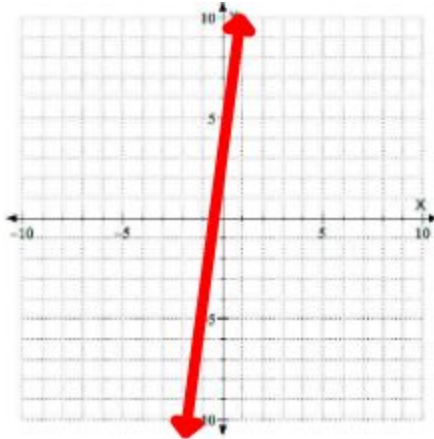
7) $y = x$



8) Graph using x and y intercepts: $3x - 2y = 12$



9) Graph using x and y intercepts: $2y = 14x + 7$



For more help go here:

<https://www.khanacademy.org/math/algebra/two-var-linear-equations>

H) Solving Linear Equations

Solve: Simplify all solutions. Leave non-integer answers as reduced improper fractions.

1) $7x - 29 = -15$

$$x = 2$$

2) $3(4x - 15) = 19$

$$x = \frac{16}{3}$$

3) $7x - 18 = 4x - 31$

$$x = -\frac{13}{3}$$

4) $4 + 6(x + 2) = 2 - (x - 3)$

$$x = -\frac{11}{7}$$

5) $\frac{7}{2}x - 1 = 2x + 5$

$$x = 4$$

6) $\frac{3}{4}(x - 2) = x + 1$

$$x = -10$$

7) $\frac{1}{2}x - \frac{5}{3} = -\frac{2}{3}x + \frac{19}{4}$

$$x = \frac{11}{2}$$

8) $-\frac{2}{3}\left(\frac{6}{5}x - \frac{7}{10}\right) = \frac{17}{20}$

$$x = -\frac{23}{48}$$

For more help go here:

<https://www.khanacademy.org/math/algebra/one-variable-linear-equations>

I) Absolute Value Equations

Solve:

1) $|x| = 8$

$x=8$ or $x=-8$

2) $|x| = -9$

\emptyset

3) $|x - 9| = 8$

$x=17$ or $x = 1$

4) $2|3x - 5| = 20$

$x = 5$ or $x = -\frac{5}{3}$

5) $\frac{1}{2}|x + 3| - 4 = 1$

$x = 7$ or $x = -13$

For more help go here:

<https://www.khanacademy.org/math/algebra-home/alg-absolute-value/alg-absolute-value-equations/v/absolute-value-equations>

J) Inequalities

Solve. Then graph all solutions on a number line.

1) $4x + 5 > 25$

$x > 5$

2) $7 - n \leq 19$

$n \geq -12$

3) $3x + 8 < 5x - 12$

$x > 10$

4) $-1 \leq x + 5 < 8$

$-6 \leq x < 3$

5) $-16 < 3x - 4 \leq 2$

$-4 < x \leq 2$

6) $3 \leq \frac{2}{3}x - 4 < 5$

$\frac{21}{2} \leq x < \frac{27}{2}$

$$7) 3x < 12 \text{ or } x+4 > 15$$

$$x < 4 \text{ or } x > 11$$

$$8) 4x > 16 \text{ or } 2x - 8 < 4$$

$$x > 4 \text{ or } x < 6$$

$$9) |x| \leq 6$$

$$-6 \leq x \leq 6$$

$$10) |x| > 5$$

$$x > 5 \text{ or } x < -5$$

$$11) |x| < -2$$

$$\emptyset$$

$$12) |x| > -3$$

all real #s

$$13) |x - 9| \geq 4$$

$$x \geq 13 \text{ or } x \leq 5$$

$$14) |3x + 1| < 7$$

$$-\frac{8}{3} < x < 2$$

$$15) 3|x - 4| + 2 \leq 11$$

$$1 \leq x \leq 7$$

For more help go here:

<https://www.khanacademy.org/math/algebra/one-variable-linear-inequalities>

<https://www.khanacademy.org/math/algebra-home/alg-absolute-value/alg-absolute-value-inequalities/v/absolute-value-inequalities>