Honors Algebra 2
2019 - 2020

B for Behavior
E for Engagement
A for Academic Preparedness
R for Respect
S for Safety

Honors Algebra 2 is a rigorous course that requires the use of Algebra 1 skills. The summer work is designed to maintain and reinforce these prerequisite skills so as to prepare you for the upcoming school year. **If you need help with a topic, use the online Algebra 1 textbook as a resource (the link is on our Google Classroom).**

- Complete the summer packet in **pencil only**
- Show all necessary work
- Due on the first day of class
- A **test** on the summer packet **will be given on the first day of class**

Please join Google Classroom using the code
ucnk64

Google Classroom will be used for future postings and information throughout the summer.

For the 2019-2020 school year, you will be required to bring the following supplies to class every day:

- TI-84 Plus or TI-84 CE graphing calculator
- $1\frac{1}{2}$ inch 3-ring binder with 8 dividers
- Red, pink, or orange pen
- Mechanical pencils
- Loose leaf paper
- Color pencils
- Highlighters (3 different colors)
Chapter 1: Solving Linear Equations

1) \(6a - 10 = 3a + 17\)

2) \(5w + 4 - 7w = 12\)

3) \(\frac{3}{4}(12c - 4) = 15c + 15\)

4) \(11(4p + 4) - 4p = 4(7p - 7)\)

5) \(\frac{3}{5}e - 6 = -\frac{2}{5}(e - 10) - 7\)

Solving Proportions

1) Solve: \(\frac{3}{x} = \frac{4}{9}\)

2) Solve: \(\frac{3}{x-1} = \frac{4}{x+1}\)
Determine if each equation has no solution or an infinite number of solutions.

1) \(4(x + 2) = 2(2x + 3) + 2\)
   - No solutions
   - Infinitely many solutions

2) \(6m + 4 - 4m = \frac{2}{3}(3m - 9)\)
   - No solutions
   - Infinitely many solutions

**Rewriting Equations and Formulas**

\[ M = P(1.02)^t \]

1) The formula above gives the amount of money \(M\) earned after \(P\) dollars is invested for \(t\) years. Which of the following gives \(P\) in terms of \(M\) and \(t\)?

   A) \(P = M - (1.02)^t\)
   B) \(P = \frac{M}{(1.02)^t}\)
   C) \(P = M + (1.02)^t\)
   D) \(P = M(1.02)^t\)

\[ a = 1,052 + 1.08t \]

2) The speed of a sound wave in air depends on the air temperature. The formula above shows the relationship between \(a\), the speed of a sound wave, in feet per second, and \(t\), the air temperature, in degrees Fahrenheit.

Which of the following expresses the air temperature in terms of the speed of a sound wave?

   A) \(t = \frac{a - 1,052}{1.08}\)
   B) \(t = \frac{a + 1,052}{1.08}\)
   C) \(t = \frac{1,052 - a}{1.08}\)
   D) \(t = \frac{1.08}{a + 1,052}\)

\[ Ax + By = C \]

3) The equation above represents the standard form of a line. Which of the following expresses \(y\) in terms of \(A\), \(B\), \(C\), and \(x\)?

   A) \(y = C - Ax - B\)
   B) \(y = \frac{C - Ax}{B}\)
   C) \(y = \frac{C - B}{Ax}\)
   D) \(y = \frac{C + Ax}{B}\)
Chapter 2: Solving and Graphing Inequalities

Write an inequality that represents the graph.
1) ____________ 2) ____________

Solve each inequality.
3) \( \frac{x}{2} + 4 \geq 1 \)
4) \( 6x - 5 < 2x + 11 \)

5) What is the solution to the inequality \(-2x + 25 < 11\)?
   A) \( x < 7 \)
   B) \( x > 7 \)
   C) \( x > -18 \)
   D) \( x < -18 \)

Determine if each inequality has no solution or an infinite number of solutions.
1) \( \frac{1}{2}(6x + 8) \geq 3(x + 5) \)
   - No solutions
   - Infinitely many solutions

2) \( 4x + 3 < 6x - 2x + 8 \)
   - No solutions
   - Infinitely many solutions
Chapter 3: Graphing Linear Equations

Give the slope of each line.
1) \( m = \) ____________  
2) \( m = \) ______________  
3) \( m = \) ______________  
4) \( m = \) ______________

5a) What is the \( x \)-intercept of the graph of the equation \( 2x + 6y = 6 \) \((y = 0)\)
A) 1  
B) 2  
C) 3  
D) 6

5b) What is the \( y \)-intercept of the graph of the equation \( 2x + 6y = 6 \) \((x = 0)\)
A) 1  
B) 2  
C) 3  
D) 6

6) What is the \( x \)-intercept of the line with equation \( y = 2x + 6 \)?  
6) __________

7) Find the slope of the line passing through the given points. \( m = \frac{y_2 - y_1}{x_2 - x_1} \)

a) \((-4,1)\) and \((2,6)\)

b) \((2,4)\) and \((-4,4)\)

c) \((1,-4)\) and \((-2,-7)\)

d) \((6,3)\) and \((6,8)\)

8) Which of the following is the slope-intercept form of \( 3x + 4y = 8 \)?

A) \( y = \frac{3}{4}x + 2 \)  
B) \( y = -\frac{3}{4}x + 2 \)  
C) \( y = \frac{4}{3}x + 2 \)  
D) \( y = -\frac{4}{3}x + 2 \)
Graph each line using the slope and $y$-intercept.

9) $y = -4x + 3$

slope ______  $y$-int ______

10) $y = \frac{1}{2}x - 5$

slope ______  $y$-int ______

Graph each horizontal or vertical line.

11) $y = 3$

12) $x = 3$

13) The total amount of water, $w$, in gallons, left in a tank can be modeled by the equation $w = 300 - 5t$, where $t$ is the number of hours since the tank started leaking. Which of the following is the best interpretation of the number 5 in the equation?

A) The tank is empty after 5 hours
B) The tank loses 5 gallons of water each hour
C) The tank continues to lose water until 5 gallons are left
D) Each hour, the tank loses 5 less gallons of water than it did in the previous hour

14) A bank customer made an initial deposit into a savings account, and then deposited a fixed amount each week into the account. The equation above models the amount, $a$, in dollars after $t$ weeks. What was the dollar amount of the initial deposit? $\$ ________
Chapter 4: Writing Linear Equations

Write the equation of each line in slope-intercept form \( y = mx + b \). 

1) ___________   2) ___________

3) Write the slope-intercept form of the line with slope = \( \frac{1}{4} \) that passes through (0, 2).

4) Write the slope-intercept form of the line **perpendicular** to \( y = -\frac{1}{2}x - 8 \) that passes through (0, 6).

Choose the equation of each line.

5) 

![Graph of a vertical line passing through (5, 2)](image)

A) \( x = 1 \)  
B) \( y = x + 1 \)  
C) \( y = 1 \)  
D) \( y = x \)

6) 

![Graph of a horizontal line passing through (5, 2)](image)

A) \( x = -2 \)  
B) \( y = 2 \)  
C) \( y = -2 \)  
D) \( y = x - 2 \)

7) Which is the equation of a **vertical** line passing through the point (5, 2)?

A) \( x = 2 \)  
B) \( x = 5 \)  
C) \( y = 2 \)  
D) \( y = 5 \)
Example: Write the equation of the line passing through the point (3, 1) with slope 2.

Solution: We are given the slope \((m)\) is 2. We need to find the \(y\)-intercept \((b)\).

\[
\begin{align*}
y &= 2x + b \quad \text{write equation} \\
1 &= 2(3) + b \quad \text{substitute 3 for } x \text{ and 1 for } y \\
1 &= 6 + b \quad \text{simplify} \\
-5 &= b \quad \text{subtract 6 from each side}
\end{align*}
\]

Since \(m = 2\) and \(b = -5\), we can then write the equation \(y = 2x - 5\).

8) Which is the equation of a line that has slope 4 and passes through the point (3, -10)?

A) \(y = 4x - 22\)  
B) \(y = 4x + 22\)  
C) \(y = 4x - 43\)  
D) \(y = 4x + 43\)

Write the \textbf{slope-intercept form} of the line with the given characteristics.

9) passes through (2, 1) and (3, -5)  

10) parallel to \(y = -3x + 5\); passes through (-4, 6)

The \textbf{point-slope form} of a linear equation is

\[
y - y_1 = m(x - x_1)
\]

where \(m\) is the slope and \((x_1, y_1)\) is a point on the line.

11) Which \textbf{point-slope} equation represents a line that passes through (5, -3) with slope 6?

A) \(y - 5 = 6(x + 3)\)  
B) \(y + 5 = 6(x - 3)\)  
C) \(y + 3 = 6(x - 5)\)  
D) \(y - 3 = 6(x + 5)\)

12) What is the slope of the line with equation \(y - 5 = -6(x - 2)\)?  

13) Complete the ordered pair that lies on the line with equation \(y - 8 = \frac{1}{2}(x + 3)\).

\((-3, \_\_\_\_\_)\)

14) Rewrite \(y + 1 = -2(x - 3)\) in slope-intercept form.
Chapter 5: Solving Systems of Equations

1) Give the \((x, y)\) solution to the system graphed below.  

\[
\begin{align*}
\text{Graph of the system.}
\end{align*}
\]

1) ______________

2) Find the \((x, y)\) solution to the system of equations by graphing.  

\[
\begin{align*}
y &= 3x - 1 \\
y &= -2x + 4
\end{align*}
\]

2) ______________

3) Which of the following ordered pairs \((x, y)\) is a solution of the system below?

\[
\begin{align*}
3x + 5y &= 10 \\
-x + y &= 2
\end{align*}
\]

A) \((-2, 0)\)  
B) \((0, 2)\)  
C) \((2, 4)\)  
D) \((4, 6)\)

4) Write a system of equations for the system graphed below.

\[
\begin{align*}
y &= \underline{\quad} \\
y &= \underline{\quad}
\end{align*}
\]

4) ______________ ______________

Find the \((x, y)\) solution to the system of equations.

5) \[
\begin{align*}
x &= 3y \\
2x + y &= 14
\end{align*}
\]

5) ______________

6) \[
\begin{align*}
2x + 4y &= 20 \\
y &= x + 2
\end{align*}
\]

6) ______________
7) An online movie club has an initiation fee of $10 plus $4 per movie rented. Another club has an initiation fee of $20 plus $2 per movie rented. The equations below model the memberships for the two clubs.
\[
\begin{align*}
c &= 4m + 10 \\
c &= 2m + 20
\end{align*}
\]
a) After how many movies will the memberships cost the same amount? a) __________
b) What is that cost? b) __________

8) Find the \((x, y)\) solution to the system of equations.
\[
\begin{align*}
2x + 3y &= 14 \\
-2x + 2y &= 6
\end{align*}
\]
8) __________

9) What is the solution to the system solved below?
\[
\begin{align*}
-4x + 2y &= 5 \\
4x - 2y &= 1
\end{align*}
\]
\[
0 = 6
\]
A) \((0, 6)\)
B) \((6, 0)\)
C) No solution
D) Infinitely many solutions

10) Find the \((x, y)\) solution to the system of equations.
\[
\begin{align*}
3x + y &= 10 \\
2x + 2y &= 8
\end{align*}
\]
10) __________
Chapter 6.1: Exponents

1) The product of $6x^3y^3$ and $2x^2y$ is
   A) $3xy^2$  B) $8x^5y^4$  C) $12x^5y^4$  D) $12x^6y^3$

2) $4^{-2} =$
   A) $\frac{1}{16}$  B) $-16$  C) $-8$  D) $\frac{1}{8}$

3) $\frac{x}{x^3} =$
   A) $-x^3$  B) $\frac{1}{x^3}$  C) $\frac{x}{-3}$  D) $x^3$

4) For any nonzero value of $x$, $\left(x^4\right)^{-2} =$
   A) $x^8$  B) $\frac{1}{x^8}$  C) $x^2$  D) $-8x$

5) Expressed in simplest form, $\frac{12a^3c}{4ac}$ is equivalent to
   A) $8a^2$  B) $3a^2$  C) $3a^2c$  D) $3a^3c$

6) Which expression is equivalent to $\frac{2x^6-18x^4+2x^2}{2x^2}$?
   A) $x^3-9x^2$  B) $x^4-9x^2$  C) $x^3-9x^2+1$  D) $x^4-9x^2+1$

7) $\left(2x^4\right)^3$
   A) $8x^{12}$  B) $8x^7$  C) $6x^7$  D) $6x^{12}$

8) $x^5y^{-2}$
   A) $\frac{y^2}{x^5}$  B) $\frac{x^5}{y^2}$  C) $\frac{1}{x^5y^2}$  D) $x^5y^2$

9) $3^0 =$
   A) $0$  B) $1$  C) $3$  D) $\frac{1}{3}$
1) Write $3x - 2x^2 + 4 + x^3$ in descending order for the variable $x$.

\[ (3x^2 - 5x + 2) + (5x^2 - 2x - 6) \]

2) What is the sum of the two polynomials above?

A) $8x^2 - 7x - 4$  
B) $8x^2 + 7x - 4$  
C) $8x^4 - 7x^2 - 4$  
D) $8x^4 + 7x^2 - 4$

\[ (x^2y - 3y^2 + 5xy^2) - (-x^2y + 3xy^2 - 3y^2) \]

3) Which of the following is equivalent to the expression above?

A) $4x^2y^2$  
B) $8xy^2 - 6y^2$  
C) $2x^2y + 2xy^2$  
D) $2x^2y + 8xy^2 - 6y^2$

4) Find each product.

a) $3x(5x^2 - 4x + 1)$

5) Find each product.

a) $(x + 3)(x + 4)$

b) $(x - 7)(x - 1)$

c) $(x + 6)(x - 6)$

d) $(2x + 3)(2x - 3)$

e) $(x + 4)^2$

6) Which trinomial is equivalent to $(3x - 1)(x + 4)$?

A) $3x^2 + 11x - 4$  
B) $3x^2 - 11x + 4$  
C) $3x^2 + 13x - 4$  
D) $3x^2 + 11x + 4$