

## 2016 ALGEBRA 2 HONORS: SUMMER PACKET

Complete each problem and be prepared to explain your solutions on the first day of class.

### ORDER OF OPERATIONS

Evaluate each expression without the use of a calculator.

1)  $2^4 \cdot 3 - 16 \div 4$

2)  $6 - 2^2 \cdot 2 + 11$

### SIMPLIFICATIONS

Simplify by using the distributive property and combining all like terms. Simplify as much as possible.

3)  $3m(n - 2m) - 2n(2m - 3n)$

4)  $-3\left(-\frac{7}{4}a + \frac{1}{6}\right) + \frac{5}{2}\left(3 - \frac{a}{2}\right)$

### EVALUATE

Evaluate the following expression when  $x = -5$ ,  $y = 3$ , and  $z = 1$ .

5)  $5(x - 2y + z) - 2(4x + 3y - z)$

### LAWS OF EXPONENTS

Simplify by using the laws of exponents. Simplify as much as possible. No negative exponents.

$$6) \frac{-16a^3b^2x^4y}{-48a^4bxy^3}$$

$$7) 5xy^2(8x^6y^{-3})^{-2}$$

### WORKING WITH RADICALS

Simplify these radicals. Do not give decimal answers. Leave answers in simplest radical form. Rationalize the denominator when necessary.

$$8) 4\sqrt{27} + 8\sqrt{48}$$

$$9) \frac{3\sqrt{3}}{\sqrt{2}}$$

### MULTIPLICATION OF POLYNOMIALS

Find each product. Simplify as much as possible.

$$10) (a-4)(a^2+5a-7)$$

$$11) (8-\sqrt{7})(1+\sqrt{7})$$

**FACTORING**

Factor completely using an appropriate factoring method.

12)  $5a^2b^2c - 15abc^2$

13)  $x^2 - 7x + 6$

14)  $2r^2 - 3r - 20$

15)  $y^3 + 2y^2 - 81y - 162$

**SOLVING EQUATIONS**

Solve each equation. Do not give decimal answers. Leave answers as simplified fractions.

16)  $\frac{y+4}{y-1} = \frac{4}{3}$

17)  $x - 5 = \frac{1}{3}(6x - 5)$

18) Solve for k.  $\frac{8a^2b^3}{3k} = 4a$

19) Solve for m.  $\sqrt{2m} = a + 3$

$$20) \frac{x-4}{2x-7} = \frac{x+4}{3x+7}$$

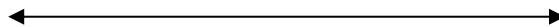
$$21) \sqrt{x+5} - 6 = -2$$

$$22) 16(-x + \frac{3}{8}) + \frac{1}{3}(6 + 3x) = 4x - 21$$

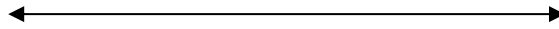
**SOLVING EQUALITIES & INEQUALITIES INCLUDING ABSOLUTE VALUE**

Solve the following equalities and inequalities. Then graph the solution.

$$23) 2 | 2x + 6 | - 8 = 32$$



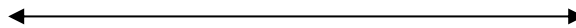
24)  $2 | 4 - 2x | - 10 \geq 20$



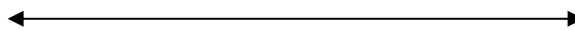
25)  $-5 \leq 2 - h$  or  $6h + 5 \geq 71$



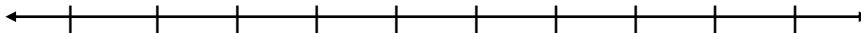
26)  $1 \leq 9 + 4x < 10$



27)  $.5 (12x + 4) > 2(x + 3)$  and  $-2 (4x - 5) < 3 (5x + 6)$



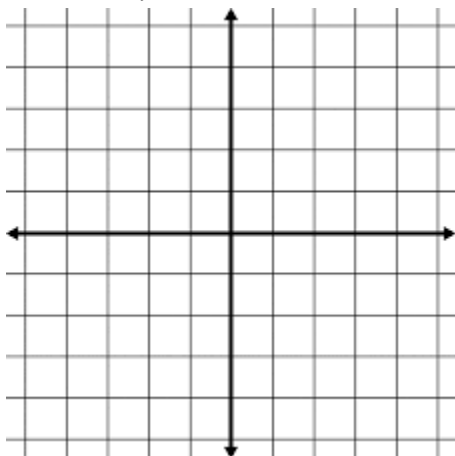
28) Commander Greg wants to insure that his engine is in proper working condition before competing in his first NASCAR race. He is refitting his pistons into their cylinders. He tells the machinist that the piston diameter cannot be greater than 4.025" and no less than 3.975". Graph the acceptable range of the diameter on the line below. Then write an **absolute value inequality** to match.



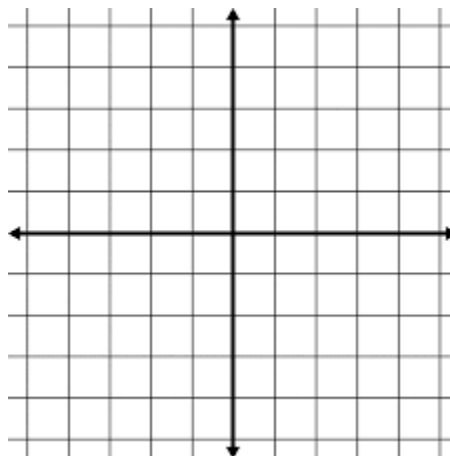
**COORDINATE PLANE AND GRAPHING**

Graph each equation.

29)  $3x - 2y = 10$



30)  $y = 2$



Determine if the following pairs of lines are parallel, perpendicular or neither.

31)  $y = 2x - 6$  and  $3x - 6y = 4$

32)  $4y - 10x = 3$  and  $5x = 7 + 2y$

33) Write an equation of the line in slope-intercept form of the line that passes through the points  $(-4, -1)$  and  $(2, -4)$ .

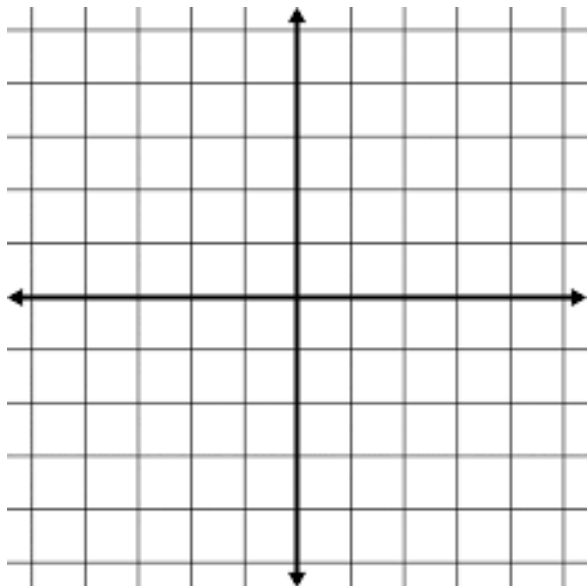
34) Write the three forms for the equation of a line. Then write the equation of the line that contains point  $(-2, -4)$  and is perpendicular to the line  $3x + y = -5$ .

35) Point  $M(5, 2)$  is the midpoint of segment  $\overline{XY}$ . Point  $X$  has coordinates  $(-4, 6)$ . Find the coordinates of point  $Y$ .

36) The points  $(4, 2)$  and  $(-1, y)$  are  $\sqrt{74}$  units apart. Use the distance formula to determine the value of  $y$ .

37) Complete the table of values for the function  $f(x) = 3^x$  and sketch the graph of  $f(x)$ .

X	-2	-1	0	1	2
f(x)					

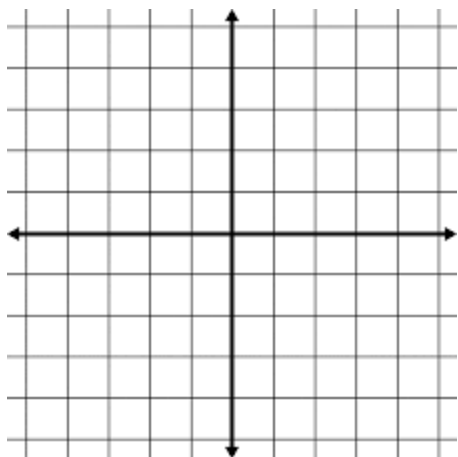


### SYSTEMS OF LINEAR EQUATIONS

Solve the system by the indicated method. State the solution as an ordered pair.

38) The graphing method.

$$\begin{cases} 3x - y = -6 \\ x + y = 2 \end{cases}$$



39) The substitution method.

$$\begin{cases} x = y - 11 \\ x - 3y = 1 \end{cases}$$

40) The elimination method

$$\begin{cases} 6x - 5y = 9 \\ 9x - 7y = 15 \end{cases}$$



## REAL NUMBER SETS

41) Match the following terms with the appropriate definitions by placing the appropriate letter in the correct corresponding blank.

- a. Irrational numbers      \_\_\_\_\_ 0 and all positive integers
- b. Whole numbers      \_\_\_\_\_ Numbers that can be expressed as a ratio of integers.
- c. Integers      \_\_\_\_\_ Real numbers that cannot be expressed as a ratio of integers
- d. Real numbers      \_\_\_\_\_ Whole numbers and their opposites
- e. Rational numbers      \_\_\_\_\_ Decimal numbers or all numbers on a number line
- f. Natural numbers      \_\_\_\_\_ Counting numbers

## VOCABULARY

42) Explain the difference between the mathematical terms, **opposite** and **reciprocal**.

43) Explain the difference between the mathematical terms, **power** and **exponent**.

44) Explain the difference between the mathematical terms, **algebraic expression**, **equation**, and **function**.

45) Explain the difference between the mathematical terms, **domain** and **range**. Then identify the domain and range of the function:  $f(x) = x^2 + 1$

46) Use the expression:  $2x^2 + 3x - 1$  to define the terms **coefficient**, **variable**, and **constant**.

47) Given the equation,  $2x^2 + 3x - 1 = 5$ , what does it mean to “**solve the equation**”?