

Key

Algebra 2 Chapter 1 Pre-Test

Each problem is worth 4 points. Please show all work in order to receive partial credit for incorrect responses.

1.) Find the opposite of each number.

a) 8 -8

b) $\frac{1}{3}$ $-\frac{1}{3}$

c) -7 7

d) -0.6 0.6

2.) Find the reciprocal of each number.

a) 4 $\frac{1}{4}$

b) $\frac{5}{7}$ $\frac{7}{5}$

c) $-\frac{1}{2}$ -2

d) -6 $-\frac{1}{6}$

3.) Simplify.

a) $|7 - 10|$ $| -3 | = 3$

b) $-|-8|$ $-(8) = -8$

c) $0.3|-4|$ $0.3(4) = 1.2$

d) $-|11 - 18|$ $-(1-7) = -(7) = -7$

4.) Determine whether each number is rational or irrational. In addition, name the set(s) of numbers to which each number belongs.

- a) 6.779 rational, terminating decimal
- b) 0.567567567... rational, repeating decimal
- c) 9 rational, counting, whole, integer numbers
- d) 0 rational, whole, integer
- e) -3 rational, integer
- f) π irrational
- g) $\sqrt{16}$ rational, perfect square
- h) $\sqrt{50}$ irrational, nonperfect square

5.) Simplify by combining like terms.

a) $6a - 4(a + 1)$

$$6a - 4a - 4$$

$$\boxed{2a - 4}$$

b) $11x + 7y + 3x - 5y$

$$11x + 3x \quad 7y - 5y$$

$$\boxed{14x + 2y}$$

6.) Simplify by combining like terms.

c) $a(a - c) + c(c - a)$

$$a^2 - ac + c^2 - ac = \boxed{a^2 + c^2 - 2ac}$$

d) $\frac{3(x+y)}{4} + \frac{9x \cdot 2}{2 \cdot 2}$

$$\frac{3(x+y)}{4} + \frac{18x}{4} = \frac{3x+3y}{4} + \frac{18x}{4} = \frac{18x+3x+3y}{4} = \boxed{\frac{21x+3y}{4}}$$

7.) Simplify the algebraic expression. Then evaluate.

$$7(g + h) - (g - h); \quad g = 4, h = -5$$

$$7g + 7h - g + h$$

$$6g + 8h$$

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

$$24 - 40 = \boxed{-16}$$

8.) Evaluate each expression for the given variable.

$$8r^2 + 4(r - s) - 3s; \quad r = 3, s = -2$$

$$8r^2 + 4r - 4s - 3s$$

$$8r^2 + 4r - 7s$$

$$8(3)^2 + 4(3) - 7(-2)$$

$$8(9) + 4(3) - 7(-2)$$

$$72 + 12 + 14$$

$$84 + 14 = \boxed{98}$$

9.) Evaluate each expression for the given variable.

$$-n(3m + 2) - 2m^2; \quad m = 3, n = 5$$

$$-3mn - 2n - 2m^2$$

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

$$-9(5) - 2(5) - 2(3)^2$$

$$-55 - 18$$

$$-45 - 10 - 2(9)$$

$$-45 - 10 - 18$$

$$\boxed{-73}$$

10.) Evaluate each expression for the given value of the variable.

$$a^2 + b^2; \quad a = -5, b = 6$$

$$(-5)^2 + (6)^2$$

$$25 + 36 = \boxed{61}$$

11.) Solve each equation for the given variable.

$$5t - 3f = 2t, \text{ for } t$$

$$\begin{array}{r} 5t - 3f = 2t \\ -5t \qquad -5t \end{array}$$

$$\frac{-3f}{-3} = \frac{-3t}{-3}$$

$$t = f$$

12.) Solve each equation for the given variable.

$$\frac{x+2y}{3} + 5y = 4x, \text{ for } y$$

$$3\left(\frac{x+2y}{3} + 5y = 4x\right)$$

$$x + 2y + 15y = 12x$$

$$\begin{array}{r} x + 17y = 12x \\ -x \qquad -x \end{array}$$

$$\frac{17y}{17} = \frac{11x}{17}$$

$$y = \frac{11x}{17}$$

13.) Solve for a.

$$15\left(\frac{2}{3}a + \frac{1}{5}b = 4 - a\right)$$

$$\frac{30a}{3} + \frac{15b}{5} = 60 - 15a$$

$$\begin{array}{r} 10a + 3b = 60 - 15a \\ +15a \end{array}$$

$$\begin{array}{r} 25a + 3b = 60 \\ -3b \qquad -3b \end{array}$$

$$\frac{25a}{25} = \frac{60 - 3b}{25}$$

$$a = \frac{60 - 3b}{25}$$

14.) Solve for x.

$$\frac{x+y}{z} = \frac{3}{7}$$

cross multiply
across equals sign.

$$7(x+y) = 3z$$

$$\begin{array}{r} 7x + 7y = 3z \\ -7y \qquad -7y \end{array}$$

$$\frac{7x}{7} = \frac{3z - 7y}{7}$$

$$x = \frac{3z - 7y}{7}$$

15.) What is the restriction in each of the following equations:

a) $\sqrt{x-4} = 9$

$$\begin{array}{r} x-4 \geq 0 \\ +4 \quad +4 \\ \hline x \geq 4 \end{array}$$

cannot have a negative square root

b) $\frac{x-7}{4-x} = 3$

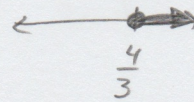
$$\begin{array}{r} 4-x \neq 0 \\ -4 \quad -4 \\ \hline -x \neq -4 \\ \hline -1 \quad -1 \\ \hline x \neq 4 \end{array}$$

Denominator cannot equal zero

16.) Solve the inequality. Graph the solution.

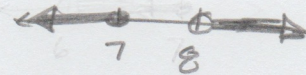
$$\begin{array}{r} \curvearrowright \\ -6(2-b) + 3b \geq 0 \\ -12 + 6b + 3b \geq 0 \\ -12 + 9b \geq 0 \\ +12 \quad +12 \\ \hline 9b \geq 12 \\ \hline \frac{9b}{9} \geq \frac{12}{9} \end{array}$$

$$\begin{array}{l} b \geq \frac{12}{9} \\ b \geq \frac{4}{3} \end{array}$$



17.) Solve the compound inequality. Graph the solution.

$$\begin{array}{r} 3x \leq 21 \text{ or } -9x < -54 \\ \hline \frac{3x}{3} \leq \frac{21}{3} \\ \hline \boxed{x \leq 7} \end{array} \quad \begin{array}{r} -72 \\ -9x < -72 \\ \hline \frac{-9x}{-9} < \frac{-72}{-9} \\ \hline \boxed{x > 8} \end{array}$$



18.) Solve the inequality. Graph the solution.

$$\begin{array}{r} \curvearrowright \\ \frac{2}{3}(-6x + 15) \geq 6 \\ -12x + 30 \geq 6 \\ \hline -12x + 30 \geq 6 \\ -10 \quad -10 \\ \hline -4x \geq -4 \\ \hline -1 \quad -1 \\ \hline x \leq 1 \end{array}$$



$$\begin{array}{r} -4x + 10 \geq 6 \\ -10 \quad -10 \\ \hline -4x \geq -4 \\ \hline -1 \quad -1 \\ \hline x \leq 1 \end{array}$$

19.) Solve each equation. Check for extraneous solutions

$$|x + 4| = 9$$

$$\begin{array}{r} x + 4 = 9 \\ -4 \quad -4 \end{array}$$

$$\begin{array}{r} x + 4 = -9 \\ -4 \quad -4 \end{array}$$

$$\boxed{x = 5} \quad \boxed{x = -13}$$

Both check

20.) Solve each equation. Check for extraneous solutions

$$|3x - 5| = 10 + 2x$$

$$\begin{array}{r} 3x - 5 = 10 + 2x \\ -2x + 5 \quad +5 \quad -2x \end{array}$$

$$\boxed{x = 15}$$

$$3x - 5 = -(10 + 2x)$$

$$\begin{array}{r} 3x - 5 = -10 - 2x \\ +2x + 5 \quad +5 \quad +2x \end{array}$$

$$\frac{5x}{5} = \frac{-5}{5} \quad \boxed{x = -1}$$

21.) Solve each equation. Check for extraneous solutions

$$\begin{array}{r} |x - 3| + 12 = 7 \\ -12 \quad -12 \end{array}$$

$$|x - 3| = -5$$

no solution!

absolute value cannot equal a negative number.

22.) Solve each equation. Check for extraneous solutions

$$|4x - 12| = 8x$$

$$\begin{array}{r} 4x - 12 = 8x \\ -4x \quad -4x \end{array}$$

$$\frac{-12}{4} = \frac{4x}{4}$$

$$-3 = x$$

↑ not a solution

$$\begin{array}{r} 4x - 12 = -8x \\ -4x \quad -4x \end{array}$$

$$\frac{-12}{-12} = \frac{-12x}{-12}$$

$$\boxed{1 = x}$$

$$|4(-3) - 12| = 8(-3)$$

$$|-24| = -24$$

↑ cannot be a negative

$$|4x - 12| = 8(1)$$

$$|4x - 12| = 8 \quad \checkmark$$

- 23.) Write the specification as an absolute value inequality.

$$4 \leq a \leq 10$$

$$\text{middle: } \frac{4+10}{2} = \frac{14}{2} = 7$$

$$\begin{array}{l} a \geq 4 \\ -7 \quad -7 \\ a - 7 \geq -3 \end{array} \quad \begin{array}{l} a \leq 10 \\ -7 \quad -7 \\ a - 7 \leq 3 \end{array}$$

$$\boxed{|a - 7| \leq 3}$$

↑ ↑
middle difference
(median)

- 24.) What is the probability of each using standard die

- a) Rolling an even number

$$\frac{3}{6} = \boxed{\frac{1}{2}}$$

- b) Rolling a 3 or 4

$$\frac{2}{6} = \boxed{\frac{1}{3}}$$

- c) Rolling a 7

$$\frac{0}{6} = 0$$

- 25.) Since 1996, there have been 23 Super Bowls. Of these, the New England Patriots have represented the AFC 9 times, the Denver Broncos 4 times, and the Pittsburgh Steelers 4 times. Use this information to answer the following:

- a) What is the probability the New England Patriots would represent the AFC during this time?

$$\boxed{\frac{9}{23}}$$

- b) What is the probability that the Denver Broncos or Pittsburgh Steelers would represent the AFC during this time?

$$\frac{4+4}{23} = \boxed{\frac{8}{23}}$$

- c) What is the probability that another team other than the New England Patriots, Denver Broncos or Pittsburgh Steelers would represent the AFC during this time?

$$\frac{23 - (9 + 4 + 4)}{23} = \frac{23 - 17}{23} = \boxed{\frac{6}{23}}$$

- d) What is the probability that Pittsburgh was not a representative during this time?

$$\frac{23 - 4}{23} = \boxed{\frac{19}{23}}$$