

Name SOLUTIONS

Each of the 18 questions is worth 5 points plus 1 points for each of 10 homework problems for a total of 100

Solve the equation.

1)  $5(y + 7) = 6(y - 7)$

$$\begin{array}{r} 5y + 35 = 6y - 42 \\ \underline{-35} \qquad \underline{-35} \end{array}$$

$$\begin{array}{r} 5y = 6y - 77 \\ \underline{-6y} \quad \underline{-6y} \end{array}$$

$$\begin{array}{r} -1y = -77 \end{array}$$

$$\boxed{y = 77}$$

DISTRIBUTE  
SUBTRACT 35  
SUBTRACT 6y  
MULTIPLY BY -1

2)  $\frac{a}{5} - \frac{1}{5} = -6$

$$\frac{a-1}{5} = -6$$

$$a-1 = -30$$

$$\boxed{a = -29}$$

ADD FRACTIONS  
MULTIPLY BY 5  
ADD 1

Solve the formula for the specified variable.

3)  $A = \frac{1}{2}h(b_1 + b_2)$  for  $b_1$

$$2A = h(b_1 + b_2)$$

$$\frac{2A}{h} = b_1 + b_2$$

$$\boxed{\begin{array}{l} b_1 = \frac{2A}{h} - b_2 \\ \text{or} \\ b_1 = \frac{2A - hb_2}{h} \end{array}}$$

MULTIPLY BY 2  
DIVIDE BY h  
SUBTRACT  $b_2$   
≠  
TRANSPOSE SIDES

Use the variable  $x$  for the unknown, and write an equation representing the verbal sentence. Then solve the problem.

4) When 2 times a number is subtracted from 7 times the number, the result is 50.

LET  $x =$  THE NUMBER

a:  $7x - 2x = 50$

$5x = 50$

COMBINE TERMS

b:  $x = 10$

DIVIDE BY 5

Solve the problem.

5) In a recent school board election, the two candidates for president received 1159 votes. The loser received 567 fewer votes than the winner. How many votes did the winner receive?

LET  $x =$  # OF WINNING VOTES

$x - 567 =$  # OF LOSING VOTES

$x + (x - 567) = 1159$

TOTAL VOTES

$2x - 567 = 1159$

COMBINE TERMS

$2x = 1726$

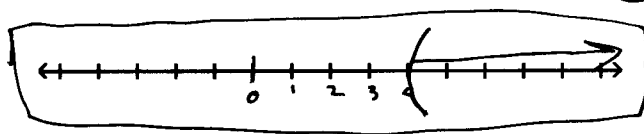
ADD 567

$x = 863$

DIVIDE BY 2

Solve the inequality. Give the solution set in both interval and graph forms.

6)  $30z - 10 > 5(5z + 2)$



a

b

$(4, \infty)$

$30z - 10 > 25z + 10$

DISTRIBUTE

$5z - 10 > 10$

SUBTRACT  $25z$

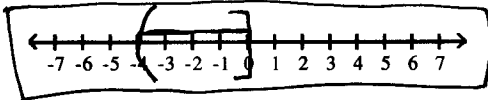
$5z > 20$

ADD 10

$z > 4$

DIVIDE BY 5

7)  $-14 < 4z + 2 \leq 2$



$$-14 < 4z + 2 \leq 2$$

$$-16 < 4z \leq 0$$

$$-4 < z \leq 0$$

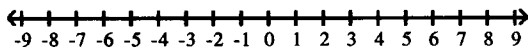
SUBTRACT 2

DIVIDE BY 4

$$\boxed{(-4, 0]}$$

For the compound inequality, give the solution set in both interval and graph forms.

8)  $5x - 1 < 4$  and  $x - 2 > -1$



$$5x - 1 < 4$$

$$5x < 5 \quad \text{ADD 1}$$

$$x < 1 \quad \text{DIVIDE BY 5}$$

$$x - 2 > -1$$

$$x > 1$$

ADD 2

NO NUMBER IS BOTH LESS THAN AND GREATER THAN 1.

THE ANSWER IS THE NULL SET  $\emptyset$

Solve the equation.

9)  $\left| 8 + \frac{1}{3}x \right| = 5$

$$8 + \frac{x}{3} = 5 \quad \text{REMOVE ABS.} \quad 8 + \frac{x}{3} = -5$$

$$\frac{x}{3} = -3 \quad \text{SUBTRACT 8}$$

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

$$x = -9 \quad \text{MULTIPLY BY 3}$$

$$x = -39$$

$$\boxed{\{-39, -9\}}$$

↑ SMALLEST FIRST

Solve the given equation or inequality. If an equation is given, then write the solution set in set notation. If an inequality is given, then write the solution set in interval notation.

10)  $|h+2| + 8 \leq 11$

$|h+2| \leq 3$       SUBTRACT 8

$h+2 \leq 3$

REMOVE ABS. VAL.

$h+2 \geq -3$

$h \leq 1$

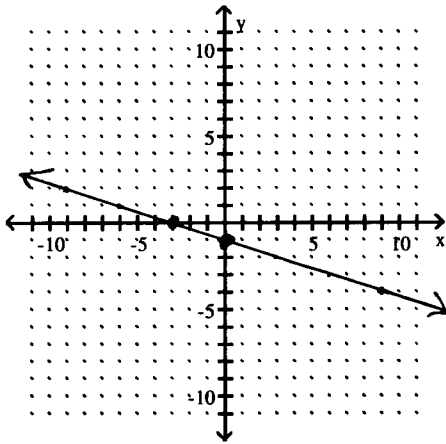
SUBTRACT 2

$h \geq -5$

$[-5, 1]$

Find the <sup>a</sup>x- and <sup>b</sup>y-intercepts. Then <sup>c</sup>graph the equation.

11)  $-3x - 9y = 9$



WHEN  $x=0$        $-9y = 9$

$y = -1$       DIVIDE BY -9

Y-INTERCEPT =  $(0, -1)$

WHEN  $y=0$        $-3x = 9$

$x = -3$       DIVIDE BY -3

X-INTERCEPT =  $(-3, 0)$

Find the midpoint of the segment with the given endpoints.

12)  $(-9, -8)$  and  $(9, 9)$

MID-POINT =  $\left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$

=  $\left( \frac{-9 + 9}{2}, \frac{-8 + 9}{2} \right)$

=  $\left( \frac{0}{2}, \frac{1}{2} \right) = \left( 0, \frac{1}{2} \right)$

Find the slope of the line through the pair of points.

13) (-5, -2) and (-8, -7)

$$\begin{aligned} \text{SLOPE} &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{-7 - (-2)}{-8 - (-5)} \\ &= \frac{-7 + 2}{-8 + 5} \\ &= \frac{-5}{-3} = \boxed{\frac{5}{3}} \end{aligned}$$

Decide whether the pair of lines is parallel, perpendicular, or neither.

14)  $3x - 4y = -10$  and  $8x + 6y = 7$

$$-4y = -3x - 10 \quad \text{SUBTRACT } 3x$$

$$y = \frac{-3}{-4}x - \frac{10}{-4}$$

$$= \frac{3x}{4} + \frac{10}{4}$$

$$1^{\text{ST}} \text{ SLOPE} = \frac{3}{4}$$

$$6y = -8x + 7$$

$$y = \frac{-8}{6}x + \frac{7}{6}$$

$$y = \frac{-4}{3}x + \frac{7}{6}$$

$$2^{\text{ND}} \text{ SLOPE} = \frac{-4}{3}$$

$$\left(\frac{3}{4}\right)\left(\frac{-4}{3}\right) = -1 \quad \text{SO} \quad \boxed{\text{LINES ARE PERPENDICULAR}}$$

Find an equation of the line that satisfies the conditions. Write the equation in standard form.

15) Through (0, 5);  $m = \frac{4}{5}$

$$\text{POINT-SLOPE} \quad m = \frac{y - y_1}{x - x_1}$$

$$\frac{4}{5} = \frac{y - 5}{x - 0}$$

$$\frac{4}{5} = \frac{y - 5}{x}$$

$$\frac{4}{5}x = y - 5 \quad \text{MULTIPLY BY } x$$

$$\frac{4}{5}x - y = -5 \quad \text{SUBTRACT } y$$

$$\boxed{4x - 5y = -25} \quad \text{MULTIPLY BY } 5$$

IN THIS SPECIFIC CASE, THE POINT GIVEN IS THE Y-INTERCEPT.

WE CAN USE THE SLOPE-INTERCEPT

$$\text{FORM} \quad y = mx + b$$

$$\boxed{y = \frac{4}{5}x + 5}$$

NOTE THAT THESE ANSWERS ARE EQUIVALENT.

Find an equation of the line satisfying the conditions. Write the equation in slope-intercept form.

16) Through  $(-6, 7)$ ; parallel to  $3x + 7y = 3$

SLOPE OF  $3x + 7y = 3$  IS

$$7y = -3x + 3$$

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

$$\text{SLOPE} = -\frac{3}{7}$$

THE NEW LINE WILL HAVE

THE SAME SLOPE.

POINT SLOPE FORM:  $m = \frac{y - y_1}{x - x_1}$

$$-\frac{3}{7} = \frac{y-7}{x+6}$$

$$-\frac{3}{7}(x+6) = y-7 \quad \text{MULT. BY } (x+6)$$

$$-\frac{3}{7}x - \frac{18}{7} = y-7 \quad \text{DISTRIBUTE}$$

$$-\frac{3}{7}x - \frac{18}{7} + 7 = y \quad \text{ADD } 7$$

$$-\frac{3}{7}x - \frac{18}{7} + \frac{49}{7} = y \quad \text{COMBINE FRACTIONS}$$

$$\boxed{y = -\frac{3}{7}x + \frac{31}{7}}$$

Solve the problem.

17) Find  $f(-2)$  when  $f(x) = 2x^2 - 3x - 7$ .

$$f(-2) = 2(-2)^2 - 3(-2) - 7$$

$$= 2 \cdot 4 + 6 - 7$$

$$= 8 + 6 - 7$$

$$\boxed{f(-2) = 7}$$

An equation that defines  $y$  as a function of  $x$  is given. Solve for  $y$  in terms of  $x$ , and replace  $y$  with the function notation  $f(x)$ .

18)  $5x - 6y = 5$

$$5x - 6y = 5$$

$$-6y = -5x + 5$$

$$y = \frac{-5}{-6}x + \frac{5}{-6}$$

$$y = \frac{5}{6}x - \frac{5}{6}$$

$$\boxed{\begin{array}{l} f(x) = \frac{5}{6}x - \frac{5}{6} \\ \text{OR } \frac{5x-5}{6} \\ \text{OR } \frac{5-5x}{-6} \end{array}} \leftarrow \text{BEST ANSWER}$$