

Show all work for full credit. Please use pencil and write legibly.
(4 points each numbered problem)

<p>1. Simplify</p> $\begin{aligned} & -5xy - (-8xy) \\ & = -5xy + 8xy \\ & = (-5 + 8)xy \\ & = 3xy \end{aligned}$	<p>2. Simplify</p> $\begin{aligned} & \frac{1}{6}x - \frac{1}{15}x \\ & = \left(\frac{1}{6} - \frac{1}{15}\right)x \\ & = \left(\frac{1 \cdot 5}{6 \cdot 5} - \frac{1 \cdot 2}{15 \cdot 2}\right)x \\ & = \left(\frac{5}{30} - \frac{2}{30}\right)x \\ & = \frac{3}{30}x \\ & = \frac{1}{10}x \end{aligned}$
<p>3. Simplify</p> $\begin{aligned} & -15 - 4(6x - 5) \\ & = -15 + -4(6x + -5) \\ & = -15 + -24x + -4 \cdot -5 \\ & = -24x + -15 + 20 \\ & = -24x + 5 \end{aligned}$	<p>4. Simplify</p> $\begin{aligned} & (9m - 1) - (5m - 3) \\ & = (9m + -1) + -1 \cdot (5m + -3) \\ & = 9m + -1 + -5m + 3 \\ & = 9m + -5m + -1 + 3 \\ & = 4m + 2 \end{aligned}$

<p>5. Solve and check.</p> <p>(a) $x - 4 = 15$ Check:</p> $\begin{array}{r} +4 \quad +4 \\ x + 0 = 19 \\ x = 19 \end{array}$ $\begin{array}{r} x - 4 = 15 \\ 19 - 4 =? 15 \\ 15 = 15 \end{array}$ <p>(b) $x + 5 = -11$ Check:</p> $\begin{array}{r} -5 \quad -5 \\ x + 0 = -16 \\ x = -16 \end{array}$ $\begin{array}{r} x + 5 = -11 \\ -16 + 5 =? -11 \\ -11 = -11 \end{array}$	<p>6. Solve and check.</p> <p>(a) $10y = 80$ Check:</p> $\begin{array}{r} \frac{10y}{10} = \frac{80}{10} \\ y = 8 \end{array}$ $\begin{array}{r} 10y = 80 \\ 10 \cdot 8 =? 80 \\ 80 = 80 \end{array}$ <p>(b) $-20 = 5h$ Check:</p> $\begin{array}{r} \frac{-20}{5} = \frac{5h}{5} \\ -4 = h \end{array}$ $\begin{array}{r} -20 = 5h \\ -20 =? 5 \cdot -4 \\ -20 = -20 \end{array}$
<p>7. Solve and check.</p> $\begin{array}{r} 5x - 11 = -21 \\ +11 \quad +11 \\ 5x + 0 = -10 \\ \frac{5x}{5} = \frac{-10}{5} \\ x = -2 \end{array}$ <p>Check:</p> $\begin{array}{r} 5x - 11 = -21 \\ 5 \cdot -2 - 11 =? -21 \\ -10 - 11 =? -21 \\ -10 + -11 =? -21 \\ -21 = -21 \end{array}$	<p>8. Solve and check.</p> $\begin{array}{r} 9 - 10w = 3 - 12w \\ 9 + -10w = 3 + -12w \\ +12w \quad +12w \\ 9 + 2w = 3 + 0 \\ \frac{-9}{2} = \frac{-9}{2} \\ 0 + 2w = -6 \\ 2w = -6 \\ \frac{2w}{2} = \frac{-6}{2} \\ w = -3 \end{array}$ <p>Check:</p> $\begin{array}{r} 9 - 10w = 3 - 12w \\ 9 - 10 \cdot (-3) =? 3 - 12 \cdot (-3) \\ 9 + -10 \cdot (-3) =? 3 + -12 \cdot (-3) \\ 9 + 30 =? 3 + 36 \\ 39 = 39 \end{array}$

9. Solve.

$$5(x - 4) - 5 = 4(5 - x)$$

$$5(x + -4) + -5 = 4(5 + -x)$$

$$5x + -20 + -5 = 20 + -4x$$

$$5x + -25 = 20 + -4x$$

$$\underline{+4x} \qquad \qquad \underline{+4x}$$

$$9x + -25 = 20 + 0$$

$$\underline{+25} \quad \underline{+25}$$

$$9x + 0 = 45$$

$$\frac{9x}{9} = \frac{45}{9}$$

$$x = 5$$

10. Solve.

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

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

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

$$2x - 24 = 3x + 6$$

$$\underline{-2x} \qquad \underline{-2x}$$

$$0 - 24 = x + 6$$

$$\underline{-6} \qquad \underline{-6}$$

$$-30 = x + 0$$

$$-30 = x$$

11. Solve.

$$-0.35x + 5.5 = 0.15x - 4.5$$

$$100(-0.35x + 5.5) = 100(0.15x - 4.5)$$

$$-35x + 550 = 15x - 450$$

$$\underline{+35x} \qquad \qquad \underline{+35x}$$

$$0 + 550 = 50x - 450$$

$$\underline{+450} \qquad \underline{+450}$$

$$1000 = 50x - 0$$

$$\frac{1000}{50} = \frac{50x}{50}$$

$$20 = x$$

12. Solve.

$$\frac{5}{7}x = -\frac{3}{10}$$

$$\frac{7}{5} \cdot \frac{5}{7}x = \frac{7}{5} \cdot -\frac{3}{10}$$

$$x = -\frac{21}{50}$$

13. Solve for a .

$$\begin{aligned} X &= 7a + b \\ \underline{-b} \quad \underline{-b} \\ X - b &= 7a + 0 \\ X - b &= 7a \\ \frac{X - b}{7} &= \frac{7a}{7} \\ \frac{X - b}{7} &= a \end{aligned}$$

14. Solve for y .

$$\begin{aligned} 12x - 4y &= 16 \\ \underline{-12x} \quad \underline{-12x} \\ 0 - 4y &= -12x + 16 \\ -4y &= -12x + 16 \\ \frac{-4y}{-4} &= \frac{-12x + 16}{-4} \\ y &= 3x + -4 \\ y &= 3x - 4 \end{aligned}$$

15. Seven times the sum of a number and two is twenty more than the number. What is the number?

Let x = the number

$$\begin{aligned} 7(x + 2) &= x + 20 \\ 7x + 14 &= x + 20 \\ \underline{-x} \quad \underline{-x} \\ 6x + 14 &= 0 + 20 \\ 6x + 14 &= 20 \\ \underline{-14} \quad \underline{-14} \\ 6x + 0 &= 6 \\ 6x &= 6 \\ \frac{6x}{6} &= \frac{6}{6} \\ x &= 1 \end{aligned}$$

16. An investor earned \$400 on an initial principal investment of \$10,000 after one year. What was the interest rate as a percent?

Let x = the rate as a percent

400 is what percent of 10,000?

$$\begin{aligned} 400 &= \frac{x}{100} \cdot 10,000 \\ 400 &= 100x \\ \frac{400}{100} &= \frac{100x}{100} \\ 4 &= x \end{aligned}$$

The rate is 4%.

17. A coin purse contains only nickels and dimes and there are five times as many dimes as nickels. The coins have a value of \$6.60. How many of each coin is in the purse?

Let x = the number of nickels

	Dimes	Nickels
Number of coins	$5x$	x
Value of each coin	0.10	0.05
Total value of coin	$0.10(5x)$	$0.05x$

$$6.60 = 0.10(5x) + 0.05x$$

$$6.60 = 0.50x + 0.05x$$

$$100(6.60) = 100(0.50x + 0.05x)$$

$$660 = 50x + 5x$$

$$660 = 55x$$

$$\frac{660}{55} = \frac{55x}{55}$$

$$12 = x \quad 12 \text{ nickels and } 60 \text{ dimes}$$

18. An electrician cuts a 90 foot wire into three pieces. The second piece is fifteen feet longer than the first and the third is three times the first. How long is each piece?

Let x = the length of the first piece

First piece	x
Second piece	$x + 15$
Third piece	$3x$

$$90 = x + x + 15 + 3x$$

$$90 = 5x + 15$$

$$-15 \quad -15$$

$$75 = 5x + 0$$

$$75 = 5x$$

$$\frac{75}{5} = \frac{5x}{5}$$

$$15 = x = 1^{\text{st}} \text{ piece}$$

$$30 = 2^{\text{nd}} \text{ piece}$$

$$45 = 3^{\text{rd}} \text{ piece}$$

19. The length of a rectangle is 18 cm more than the width. If the perimeter of the rectangle is 204 cm, then what are the length and the width?

length	$x + 18$
width	x

$$\text{Perimeter} = 2 \cdot \text{length} + 2 \cdot \text{width}$$

$$204 = 2 \cdot (x + 18) + 2 \cdot x$$

$$204 = 2x + 36 + 2x$$

$$204 = 4x + 36$$

$$-36 \quad -36$$

$$168 = 4x + 0$$

$$\frac{168}{4} = \frac{4x}{4}$$

$$42 = x$$

width = 42
length = 60

20. Solve, graph, and write the solution set in interval notation.

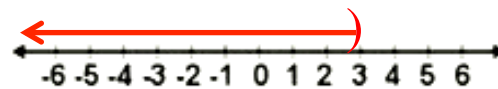
$$x - 5 < -2$$

$$\quad +5 \quad +5$$

$$x + 0 < 3$$

$$x + 0 < 3$$

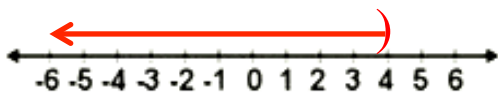
$$x < 3$$



Interval notation: $(-\infty, 3)$

21. Solve, graph, and write the solution set in interval notation.

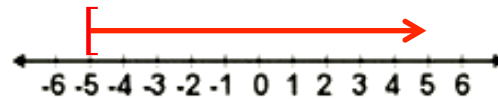
$$\begin{aligned} 3x + 5 &< 17 \\ \underline{-5} \quad \underline{-5} \\ 3x + 0 &< 12 \\ \frac{3x}{3} &< \frac{12}{3} \\ x &< 4 \end{aligned}$$



Interval notation: $(-\infty, 4)$

22. Solve, graph, and write the solution set in interval notation.

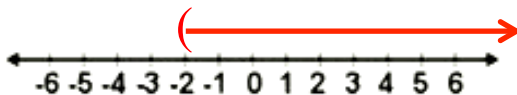
$$\begin{aligned} 5 - 2x &\leq 15 \\ \underline{-5} \quad \underline{-5} \\ 0 - 2x &\leq 10 \\ \frac{-2x}{-2} &\geq \frac{10}{-2} \\ x &\geq -5 \end{aligned}$$



Interval notation: $[-5, \infty)$

23. Solve, graph, and write the solution set in interval notation.

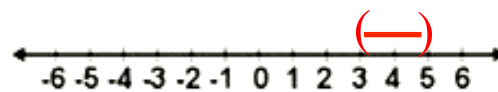
$$\begin{aligned} -\frac{1}{2}x &< 1 \\ -2 \cdot \left(-\frac{1}{2}x\right) &> -2 \cdot 1 \\ x &> -2 \end{aligned}$$



Interval notation: $(-2, \infty)$

24. Solve, graph, and write the solution set in interval notation.

$$\begin{aligned} -2 < x - 5 < 0 \\ \underline{+5} \quad \underline{+5} \quad \underline{+5} \\ 3 < x + 0 < 5 \\ 3 < x < 5 \end{aligned}$$



Interval notation: $(3, 5)$

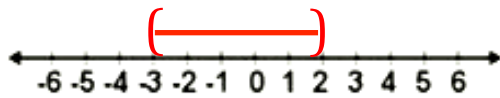
25. Solve, graph, and write the solution set in interval notation.

$$-13 < 4x - 1 < 7$$

$$\frac{+1}{+1} \quad \frac{+1}{+1} \quad \frac{+1}{+1}$$
$$-12 < 4x + 0 < 8$$

$$\frac{-12}{4} < \frac{4x}{4} < \frac{8}{4}$$

$$-3 < x < 2$$



Interval
notation: $(-3, 2)$