ALGEBRA

Name:

1) Write an equation for each sentence:

a. Five subtracted from four times a number is equal to nine.

- b. Twenty-two is twice a number increased by eight.
- c. The difference between a number and eleven is equal to five squared.
- d. Half a number minus six is equal to thirteen.
- 2) Collect like terms:
 - a. (3x 2) (5x 4) =
 - b. 11a 2b (a b) 7a =
 - c. 3x 5 2(4 + 3x) =
 - d. (a + b) (-3a + 2b) =

3) Work out and simplify:

- a) $\frac{8}{5} \frac{1}{2} \times \frac{4}{5} + \frac{3}{10} =$
- b) $\frac{3}{11} \left(\frac{5}{11} \frac{3}{4}\right) + \frac{3}{2} \div \frac{11}{3} =$

4) Solve each equation and check:

- a. 5x 6 = 3x 8
- b. $\frac{8+x}{5} = 7$
- c. 2x 3(x+1) = 9 + 5x
- d. 3x (1 4x) 2x = 3 + x
- e. -x 2(1 x) = 10 + 5x
- f. x (2x + 5) + (x 3) = 2x 10

(2 points)

(4 points)

(1 point)

(2 points)

SOLUTIONS

1) Write an equation for each sentence:

- a. Five subtracted from four times a number is equal to nine. 4x 5 = 9
- b. Twenty-two is twice a number increased by eight. 22 = 2x + 8
- c. The difference between a number and eleven is equal to five squared. $x 11 = 5^2 \rightarrow x 11 = 25$

d. Half a number minus six is equal to thirteen. $\frac{x}{2} - 6 = 13$

- 2) Collect like terms:
 - a. (3x 2) (5x 4) = 3x 2 5x + 4 = -2x + 2
 - b. 11a 2b (a b) 7a = 11a 2b a + b 7a = 3a b
 - c. 3x 5 2(4 + 3x) = 3x 5 8 6x = -3x 13
 - d. (a + b) (-3a + 2b) = a + b + 3a 2b = 4a b
- 3) Work out and simplify:

a)
$$\frac{8}{5} - \frac{1}{2} \times \frac{4}{5} + \frac{3}{10} = \frac{8}{5} - \frac{4}{10} + \frac{3}{10} = \frac{16 - 4 + 3}{10} = \frac{15}{10} = \frac{3}{2}$$

b) $\frac{3}{11} - \left(\frac{5}{11} - \frac{3}{4}\right) + \frac{3}{2} \div \frac{11}{3} = \frac{3}{11} - \frac{20 - 33}{44} + \frac{9}{22} = \frac{3}{11} + \frac{13}{44} + \frac{9}{22} = \frac{12}{44} + \frac{13}{44} + \frac{18}{44} = \frac{43}{44}$

4) Solve each equation and check:

a. $5x - 6 = 3x - 8 \rightarrow 5x - 3x = -8 + 6 \rightarrow 2x = -2 \rightarrow x = -1$

Checking: $5 \cdot (-1) - 6 = 3 \cdot (-1) - 8 \rightarrow -5 - 6 = -3 - 8 \rightarrow -11 = -11$

b.
$$\frac{8+x}{5} = 7 \rightarrow 8+x = 35 \rightarrow x = 35 - 8 \rightarrow x = 27$$

Checking: $\frac{8+27}{5} = 7 \rightarrow \frac{35}{5} = 7 \rightarrow 7 = 7$

c.
$$2x - 3(x+1) = 9 + 5x \rightarrow 2x - 3x - 3 = 9 + 5x \rightarrow 2x - 3x - 5x = 9 + 3$$

$$-6x = 12 \rightarrow x = \frac{12}{-6} \rightarrow x = -2$$

Checking: $2 \cdot (-2) - 3(-2+1) = 9 + 5 \cdot (-2) \rightarrow -4 - 3 \cdot (-1) = 9 - 10$
 $-4 + 3 = 9 - 10 \rightarrow -1 = -1$
d. $3x - (1 - 4x) - 2x = 3 + x \rightarrow 3x + 4x - 5 - 2x = 3 + x \rightarrow 3x + 4x - 2x - x = 3 + 1$
 $4x = 4 \rightarrow x = 1$
Checking: $3 \cdot 1 - (1 - 4 \cdot 1) - 2 \cdot 1 = 3 + 1 \rightarrow 3 - (1 - 4) - 2 = 4$
e. $-x - 2(1 - x) = 10 + 5x \rightarrow -x - 2 + 2x = 10 + 5x \rightarrow -2 - 10 = 5x + x - 2x$
 $-12 = 4x \rightarrow x = -\frac{12}{4} \rightarrow x = -3$
Checking: $-(-3) - 2 \cdot (1 - (-3)) = 10 + 5 \cdot (-3) \rightarrow 3 - 2 \cdot (1 + 3) = 10 - 15$
 $3 - 2 \cdot 4 = -5 \rightarrow 3 - 8 = -5 \rightarrow -5 = -5$
f. $x - (2x + 5) + (x - 3) = 2x - 10 \rightarrow x - 2x - 5 + x - 3 = 2x - 10$
 $x - 2x + x - 2x = -10 + 5 + 3 \rightarrow -2x = -2 \rightarrow x = -\frac{2}{-2} \rightarrow x = 1$
Checking: $1 - (2 \cdot 1 + 5) + (1 - 3) = 2 \cdot 1 - 10 \rightarrow 1 - 7 - 2 = 2 - 10 \rightarrow -8 = -8$