

## 4.2 - Solve Multi-Step Equations Worksheet #1

MPM1D

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SOLUTIONS

1. Solve

a)  $3 + 4m + 5m = 21$

$$9m = 18$$

$$m = 2$$

b)  $16y - 8 - 9y = 27$

$$7y = 35$$

$$y = \frac{35}{7}$$

$$y = 5$$

c)  $46 = 2 - 8w - 3w$

$$44 = -11w$$

$$\frac{44}{-11} = w$$

$$w = -4$$

d)  $3d + 4 - 9d + 12 = 0$

$$-6d + 16 = 0$$

$$-6d = -16$$

$$d = \frac{16}{6}$$

$$d = \frac{8}{3}$$

2. Solve

a)  $5x + 9 = 3x + 7$

$$5x - 3x = 7 - 9$$

$$2x = -2$$

$$x = \frac{-2}{2}$$

$$x = -1$$

b)  $-2u - 8 = 5u - 1$

$$-8 + 1 = 5u + 2u$$

$$-7 = 7u$$

$$\frac{-7}{7} = u$$

$$u = -1$$

c)  $4y - 13 = -6y + 7$

$$4y + 6y = 7 + 13$$

$$10y = 20$$

$$y = \frac{20}{10}$$

$$y = 2$$

d)  $7 - 5m = -2 - 2m$

$$7 + 2 = -2m + 5m$$

$$9 = 3m$$

$$\frac{9}{3} = m$$

$$m = 3$$

### 3. Solve

a)  $0 = 14 - x + 6x - 9$

$$0 = 5 + 5x$$

$$-5 = 5x$$

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

$$x = -1$$

c)  $4t - 5 = 2t + 5$

$$2t = 10$$

$$t = \frac{10}{2}$$

$$t = 5$$

b)  $11 - n + 3 = 3n + 3n$

$$14 = 7n$$

$$\frac{14}{7} = n$$

$$n = 2$$

d)  $6k - 3 - 2k = k - 3$

$$4k - 3 = k - 3$$

$$3k = 0$$

$$k = \frac{0}{3}$$

$$k = 0$$

### 4. Find the root of each equation

a)  $2(x - 2) = 4x - 2$

$$2x - 4 = 4x - 2$$

$$-4 + 2 = 4x - 2x$$

$$-2 = 2x$$

$$\frac{-2}{2} = x$$

$$x = -1$$

c)  $6p + 4(8 - p) = 22$

$$6p + 32 - 4p = 22$$

$$2p = -10$$

$$p = \frac{-10}{2}$$

$$p = -5$$

b)  $4c + 3 = 3(c - 4)$

$$4c + 3 = 3c - 12$$

$$c = -15$$

d)  $k = 2(11 - k) + 14$

$$k = 22 - 2k + 14$$

$$3k = 36$$

$$k = \frac{36}{3}$$

$$k = 12$$

### 5. Find the root of each equation

a)  $2(x - 3) + 3(x - 2) = 18$

$$2x - 6 + 3x - 6 = 18$$

$$5x = 30$$

$$x = \frac{30}{5}$$

$$x = 6$$

b)  $4(y - 1) - (y - 5) = 10$

$$4y - 4 - y + 5 = 10$$

$$3y = 9$$

$$y = \frac{9}{3}$$

$$y = 3$$

$$\begin{aligned} \text{c) } 2(c+2) &= 5(c+1) - 7 \\ 2c+4 &= 5c+5-7 \\ -3c &= -6 \\ c &= \frac{-6}{-3} \\ c &= 2 \end{aligned}$$

$$\begin{aligned} \text{d) } 3(t-4) &= -2(t+3) + 14 \\ 3t-12 &= -2t-6+14 \\ 5t &= 20 \\ t &= \frac{20}{5} \\ t &= 4 \end{aligned}$$

9. Solve each equation. Express fraction answers in lowest terms.

$$\begin{aligned} \text{a) } 3x - 8 &= 7x + 10 \\ -18 &= 4x \\ \frac{-18}{4} &= x \\ x &= \frac{-9}{2} \end{aligned}$$

$$\begin{aligned} \text{b) } 3 + 10i &= 4i - 18 \\ 6i &= -21 \\ i &= \frac{-21}{6} \\ i &= \frac{-7}{2} \end{aligned}$$

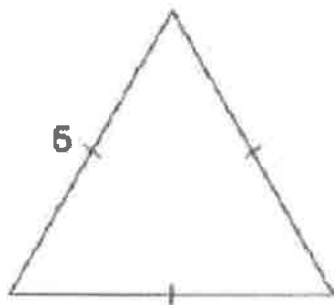
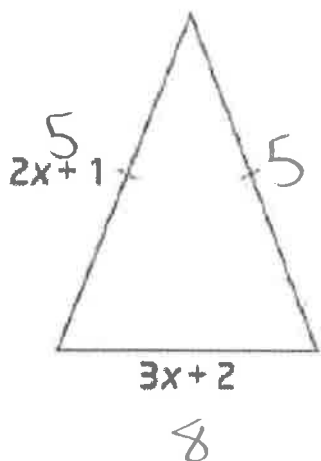
$$\begin{aligned} \text{c) } -4(u+6) &= 2(3u-4) \\ -4u-24 &= 6u-8 \\ -16 &= 10u \\ \frac{-16}{10} &= u \\ u &= \frac{-8}{5} \end{aligned}$$

$$\begin{aligned} \text{d) } 4(k-3) &= 2 - (2k-6) \\ 4k-12 &= 2-2k+6 \\ 6k &= 20 \\ k &= \frac{20}{6} \\ k &= \frac{10}{3} \end{aligned}$$

$$\begin{aligned} \text{e) } 3(p+7) - (4p-1) &= -5(2p-3) + 1 \\ 3p+21-4p+1 &= -10p+15+1 \\ -p+22 &= -10p+16 \\ 9p &= -6 \\ p &= \frac{-6}{9} \\ p &= \frac{-2}{3} \end{aligned}$$

$$\begin{aligned} \text{f) } 8 - (3w-2) &= -5(w-3) - (4w-3) \\ 8-3w+2 &= -5w+15-4w+3 \\ 10-3w &= -9w+18 \\ 6w &= 8 \\ w &= \frac{8}{6} \\ w &= \frac{4}{3} \end{aligned}$$

13. An isosceles triangle and an equilateral triangle have the same perimeter. Find the side lengths of each triangle.



$$2(2x+1) + (3x+2) = 18$$

$$4x + 2 + 3x + 2 = 18$$

$$7x = 14$$

$$x = 2$$

Get Ready for Tomorrow:

17. Solve each equation

a)  $\frac{1}{2}(x+6) = 4(x-2)$

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

$$x+6 = 8(x-2)$$

$$x+6 = 8x-16$$

$$22 = 7x$$

$$x = \frac{22}{7}$$

b)  $\frac{1}{3}k + \frac{1}{2} = \frac{1}{4}k$

$$\frac{4}{12}\left(\frac{1}{3}\right)k + \frac{6}{12}\left(\frac{1}{2}\right) = \frac{3}{12}\left(\frac{1}{4}\right)k$$

$$4k + 6 = 3k$$

$$k = -6$$

# Answers:

## 4.2 Solve Multi-Step Equations, pages 196-203

1. a)  $m = 2$       b)  $y = 5$       c)  $w = -4$       d)  $d = \frac{8}{3}$

2. a)  $x = -1$       b)  $u = -1$       c)  $y = 2$       d)  $m = 8$

3. a)  $x = -1$       b)  $n = 2$       c)  $t = 5$       d)  $k = 0$

4. a)  $x = -1$       b)  $c = -15$       c)  $p = -5$       d)  $k = 12$

5. a)  $x = 6$       b)  $y = 3$       c)  $c = 2$       d)  $t = 4$

9. a)  $x = -\frac{9}{2}$       b)  $i = -\frac{7}{2}$       c)  $u = \frac{8}{5}$

d)  $k = \frac{10}{3}$       e)  $p = -\frac{2}{3}$       f)  $x = \frac{4}{3}$

13. isosceles triangle: 5, 5, 8; equilateral triangle: 6, 6, 6

17. a)  $x = \frac{22}{7}$       b)  $k = -6$

