

Multi-Step Equations: Fractions

Sheet 1

Solve each equation.

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

$$(3a - 2 = \frac{3}{4}a + \frac{9}{4}) \times 4$$

$$\begin{array}{r} 12a - 8 = 3a + 9 \\ -3a \quad -3a \end{array}$$

$$\begin{array}{r} 9a - 8 = 9 \\ +8 \quad +8 \end{array} \rightarrow a = \frac{17}{9}$$

$$\begin{array}{r} 9a = 17 \\ \div 9 \quad \div 9 \end{array}$$

$$3) \left(\frac{7}{4}x - 3 = 2 + \frac{9}{2}x\right) \times 4$$

$$\begin{array}{r} 7x - 12 = 8 + 18x \\ -18x \quad -18x \end{array}$$

$$\begin{array}{r} -11x - 12 = 8 \\ +12 \quad +12 \\ -11x = 20 \\ \div -11 \quad \div -11 \end{array} \rightarrow x = \frac{-20}{11}$$

$$5) \left(\frac{1}{3} - \frac{2}{9}m = 15 + m\right) \times 9$$

$$\begin{array}{r} 3 - 2m = 135 + 9m \\ -9m \quad -9m \end{array}$$

$$\begin{array}{r} 3 - 11m = 135 \\ -3 \quad -3 \\ -11m = 132 \\ \div -11 \quad \div -11 \end{array} \rightarrow m = -12$$

$$7) \frac{1}{6}r + 2 = 4\frac{1}{9}r + \frac{8}{3}$$

$$\left(\frac{1}{6}r + 2 = \frac{37}{9}r + \frac{8}{3}\right) \times 18$$

$$\begin{array}{r} 3r + 36 = 74r + 48 \\ -74r \quad -74r \end{array}$$

$$\begin{array}{r} -71r + 36 = 48 \\ -36 \quad -36 \\ -71r = 12 \\ \div -71 \quad \div -71 \end{array} \rightarrow r = \frac{-12}{71}$$

$$\begin{array}{r} -71r = 12 \\ \div -71 \quad \div -71 \end{array}$$

$$2) \left(\frac{z}{2} - \frac{3}{5} = -\frac{2}{3}z + \frac{1}{6}\right) \times 30$$

$$\begin{array}{r} 15z - 18 = -20z + 5 \\ +20z \quad +20z \end{array}$$

$$\begin{array}{r} 35z - 18 = 5 \\ +18 \quad +18 \end{array}$$

$$\begin{array}{r} 35z = 23 \\ \div 35 \quad \div 35 \end{array}$$

$$\rightarrow z = \frac{23}{35}$$

$$4) \left(\frac{3c+8}{3} = \frac{1}{2} + \frac{c}{4}\right) \times 12$$

$$4(3c+8) = 6 + 3c$$

$$\begin{array}{r} 12c + 32 = 6 + 3c \\ -3c \quad -3c \end{array}$$

$$\begin{array}{r} 9c + 32 = 6 \\ -32 \quad -32 \end{array}$$

$$\begin{array}{r} 9c = -26 \\ \div 9 \quad \div 9 \end{array}$$

$$\rightarrow c = \frac{-26}{9}$$

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

$$3(q+1) = 8 - 6q$$

$$\begin{array}{r} 3q + 3 = 8 - 6q \\ +6q \quad +6q \end{array}$$

$$\begin{array}{r} 9q + 3 = 8 \\ -3 \quad -3 \end{array}$$

$$\begin{array}{r} 9q = 5 \\ \div 9 \quad \div 9 \end{array}$$

$$\rightarrow q = \frac{5}{9}$$

$$8) \left(\frac{2}{3} - \frac{3}{2}y + \frac{1}{3}y + 4 = 0\right) \times 6$$

$$4 - 9y + 2y + 24 = 0$$

$$\begin{array}{r} -7y + 28 = 0 \\ -28 \quad -28 \end{array}$$

$$\begin{array}{r} -7y = -28 \\ \div -7 \quad \div -7 \end{array}$$

$$y = 4$$

Two-Step Equations: Fractions

Solve each equation.

1) $(\frac{7}{6}d + \frac{4}{3} = -\frac{1}{3}) \times 6$

$7d + 8 = -\frac{2}{2}$

$7d = -10$

$d = -\frac{10}{7}$

2) $5\frac{1}{2} - u = \frac{9}{4}$

$(\frac{11}{2} - u = \frac{9}{4}) \times 4$

$22 - 4u = 9$
 $-4u = -13$
 $u = \frac{13}{4}$

3) $(-m - \frac{7}{8} = -10) \times 8$

$-8m - 7 = -80$

$-8m = -73$
 $m = \frac{73}{8}$

4) $(\frac{2}{7} = \frac{4}{5} + 9q) \times 35$

$10 = 28 + 315q$

$-28 = 315q$
 $q = -\frac{2}{315}$

5) ~~$2\frac{2}{5} = \frac{3}{8} + \frac{h}{\frac{1}{3}}$~~

$(\frac{12}{5} = \frac{3}{8} + 3h) \times 40$

$96 = 15 + 120h$

$81 = 120h$

$h = \frac{81}{120}$
 $= \frac{27}{40}$

6) $(\frac{5}{9}c - \frac{3}{4} = \frac{7}{9}c) \times 36$

$20c - 27 = 28c$

$-27 = 8c$
 $c = -\frac{27}{8}$

7) $(\frac{9}{4}(w - \frac{1}{9}) = \frac{7}{2}) \times 36$

$81(w - \frac{1}{9}) = 126$

$81w - 9 = 126$

$81w = 135$
 $w = \frac{135}{81} = \frac{5}{3}$

8) ~~$\frac{y}{\frac{5}{3}} + 5 = 2\frac{5}{6}$~~

$(\frac{3}{5}y + 5 = \frac{17}{6}) \times 30$

$18y + 150 = 85$

$18y = -65$
 $y = -\frac{65}{18}$

9) $(-\frac{2}{3}p + \frac{8}{3} = -3p) \times 3$

$-2p + 8 = -9p$

$8 = -7p$

$p = -\frac{8}{7}$

10) $-2\frac{1}{7}n - \frac{6}{7} = -1\frac{3}{7}$

$(-\frac{15}{7}n - \frac{6}{7} = -\frac{10}{7}) \times 7$

$-15n - 6 = -10$

$-15n = -4$
 $n = \frac{4}{15}$