

Two-Step Algebra Equations

DEVELOP: Solve each equation.

1) $4 + \frac{n}{5} = 6$

$$-4 \quad -4$$

$$\frac{n}{5} = 2$$

$$\times 5 \quad \times 5$$

$$\boxed{n = 10}$$

3) $4 + 5m = 24$

$$-4 \quad -4$$

$$\frac{5m}{5} = \frac{20}{5}$$

$$\boxed{m = 4}$$

5) $3r - 4 = 2$

$$+4 \quad +4$$

$$\frac{3r}{3} = \frac{6}{3}$$

$$\boxed{r = 2}$$

7) $4 = \frac{x}{12} + 3$

$$-3 \quad -3$$

$$1 = \frac{x}{12}$$

$$\times 12 \quad \times 12$$

$$\boxed{12 = x}$$

9) $31 = 7 + 8x$

$$-7 \quad -7$$

$$\frac{24}{8} = \frac{8x}{8}$$

$$\boxed{3 = x}$$

11) $44 = 5 + 3x$

$$-5 \quad -5$$

$$\frac{39}{3} = \frac{3x}{3}$$

$$\boxed{13 = x}$$

2) $1 + \frac{b}{2} = 5$

$$-1 \quad -1$$

$$\frac{b}{2} = 4$$

$$\times 2 \quad \times 2$$

$$\boxed{b = 8}$$

4) $3p - 5 = 25$

$$+5 \quad +5$$

$$\frac{3p}{3} = \frac{30}{3}$$

$$\boxed{p = 10}$$

6) $2 + \frac{n}{4} = 3$

$$-2 \quad -2$$

$$\frac{n}{4} = 1$$

$$\times 4 \quad \times 4$$

$$\boxed{n = 4}$$

8) $8 = 6 + \frac{a}{7}$

$$-6 \quad -6$$

$$2 = \frac{a}{7}$$

$$\times 7 \quad \times 7$$

$$\boxed{14 = a}$$

10) $44 = 3r - 4$

$$+4 \quad +4$$

$$\frac{48}{3} = \frac{3r}{3}$$

$$\boxed{16 = r}$$

12) $101 = 10b - 9$

$$+9 \quad +9$$

$$\frac{110}{10} = \frac{10b}{10}$$

$$\boxed{11 = b}$$

$$13) \cancel{-5} + 5n = 15$$

$$\cancel{+5} \quad +5$$

$$\frac{5n}{5} = \frac{20}{5}$$

$$\boxed{n = 4}$$

$$14) \cancel{3} - 2v = 13$$

$$\cancel{-3} \quad -3$$

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

$$\boxed{v = -5}$$

$$15) 37 = \cancel{-5n} + \cancel{2}$$

$$\cancel{-2} \quad \cancel{-2}$$

$$\frac{35}{-5} = \frac{-3n}{-5}$$

$$\boxed{-7 = n}$$

$$16) \cancel{-3} + 3a = 27$$

$$\cancel{+3} \quad +3$$

$$\frac{3a}{3} = \frac{30}{3}$$

$$\boxed{a = 10}$$

$$17) -23 = 4x + \cancel{5}$$

$$\cancel{-5} \quad \cancel{-5}$$

$$\frac{-28}{4} = \frac{4x}{4}$$

$$\boxed{-7 = x}$$

$$18) -19 = \cancel{5} - 4k$$

$$\cancel{-5} \quad \cancel{-5}$$

$$\frac{-24}{-4} = \frac{-4k}{-4}$$

$$\boxed{6 = k}$$

$$19) -4 = \cancel{-7} + \frac{x}{3}$$

$$\cancel{+7} \quad \cancel{+7}$$

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

$$\times 3 \quad \times 3$$

$$\boxed{9 = x}$$

$$20) -4 = \frac{x}{-4} - \cancel{5}$$

$$\cancel{+5} \quad \cancel{+5}$$

$$1 = \frac{x}{-4}$$

$$\times (-4) \quad \times (-4)$$

$$\boxed{-4 = x}$$

$$21) -10 = \frac{n}{2} - \cancel{3}$$

$$\cancel{+3} \quad \cancel{+3}$$

$$\frac{-7}{2} = \frac{n}{2}$$

$$\times 2 \quad \times 2$$

$$\boxed{-14 = n}$$

$$22) 5 = \cancel{7} + \frac{v}{-8}$$

$$\cancel{-7} \quad \cancel{-7}$$

$$\frac{-2}{-8} = \frac{v}{-8}$$

$$\times (-8) \quad \times (-8)$$

$$\boxed{16 = v}$$

$$23) \frac{a}{2} + \cancel{7} = 13$$

$$\cancel{-7} \quad \cancel{-7}$$

$$\frac{a}{2} = 6$$

$$\times 2 \quad \times 2$$

$$\boxed{a = 12}$$

$$24) 6 = \cancel{3} + \frac{x}{-4}$$

$$\cancel{-3} \quad \cancel{-3}$$

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

$$\times (-4) \quad \times (-4)$$

$$\boxed{-12 = x}$$

BOOKS NEVER WRITTEN

The Break-in by $\frac{J}{10} \frac{I}{-13} \frac{M}{-7} \frac{M}{-7} \frac{Y}{-25} \frac{D}{8} \frac{L}{72} \frac{O}{6} \frac{C}{5} \frac{K}{-4}$

Origin of Man by $\frac{E}{-1} \frac{V}{-11} \frac{A}{-2} \frac{L}{72} \frac{U}{17} \frac{S}{-6} \frac{H}{25} \frac{U}{17} \frac{N}{12}$

Making Soap by $\frac{P}{-9} \frac{H}{25} \frac{I}{-13} \frac{L}{72} \frac{T}{-8} \frac{H}{25} \frac{A}{-2} \frac{N}{12} \frac{S}{-6}$

ABOVE ARE THE TITLES OF THREE "BOOKS NEVER WRITTEN." TO DECODE THE NAMES OF THEIR AUTHORS:

Solve each equation below and find your solution in the code. Each time the solution appears, write the letter of that exercise above it.

(O) $4y - 9 = 15 \rightarrow \frac{4y}{4} = \frac{24}{4} \rightarrow y = 6$

(A) $6x + 7 = -5 \rightarrow \frac{6x}{6} = \frac{-12}{6} \rightarrow x = -2$

(S) $-9t + 2 = 56 \rightarrow \frac{-9t}{-9} = \frac{54}{-9} \rightarrow t = -6$

(P) $-69 = 7v - 6 \rightarrow \frac{-63}{7} = \frac{7v}{7} \rightarrow v = -9$

(Y) $35 = -2x - 15 \rightarrow \frac{50}{-2} = \frac{-2x}{-2} \rightarrow x = -25$

(I) $4 - 3n = 43 \rightarrow \frac{-3n}{-3} = \frac{39}{-3} \rightarrow n = -13$

(N) $12 - 5u = -48 \rightarrow \frac{-5u}{-5} = \frac{-60}{-5} \rightarrow u = 12$

(C) $-27 + 20w = 73 \rightarrow \frac{20w}{20} = \frac{100}{20} \rightarrow w = 5$

(E) $13 = 5 - 8m \rightarrow \frac{8}{-8} = \frac{-8m}{-8} \rightarrow m = -1$

(K) $11r + 60 = 16 \rightarrow \frac{11r}{11} = \frac{-44}{11} \rightarrow r = -4$

(U) $y - 24 = -7 \rightarrow y = 17$

(J) $23 - x = 13 \rightarrow \frac{-x}{-1} = \frac{-10}{-1} \rightarrow x = 10$

(V) $-67 = 6x - 1 \rightarrow \frac{-66}{6} = \frac{6x}{6} \rightarrow x = -11$

(M) $-4e - 9 = 19 \rightarrow \frac{-14e}{-4} = \frac{28}{-4} \rightarrow e = -7$

(D) $-8 = 32 - 5q \rightarrow \frac{-40}{-5} = \frac{-5q}{-5} \rightarrow q = 8$

(H) $6 + 10k = 256 \rightarrow \frac{10k}{10} = \frac{250}{10} \rightarrow k = 25$

(T) $-100 = 12t - 4 \rightarrow \frac{-96}{12} = \frac{12t}{12} \rightarrow t = -8$

(L) $36 - x = -36 \rightarrow \frac{-x}{-1} = \frac{-72}{-1} \rightarrow x = 72$

What Problem Did the Dumb Gangster Have When the Boss Told Him to Blow Up a Car?

Solve each equation below. Find your solution in the set of answers under the exercise and notice the letter next to it. Write this letter in each box that contains the number of that exercise.

- ① $3n + 5 = 6 \rightarrow \frac{3n}{3} = \frac{1}{3} \rightarrow n = \frac{1}{3}$
- ② $4 + 5x = 1 \rightarrow \frac{5x}{5} = \frac{-3}{5} \rightarrow x = \frac{-3}{5}$
- ③ $4y - 15 = -10 \rightarrow \frac{4y}{4} = \frac{5}{4} \rightarrow y = \frac{5}{4}$
- ④ $3 - 4d = 13 \rightarrow \frac{-4d}{-4} = \frac{10}{-4} \rightarrow d = \frac{-5}{2}$
- ⑤ $8 = 9x - 7 \rightarrow \frac{15}{9} = \frac{9x}{9} \rightarrow x = \frac{5}{3}$

Answers:

- A $-2\frac{1}{2}$ O $\frac{1}{3}$
- D $-\frac{3}{5}$ U $1\frac{2}{3}$
- F $\frac{7}{19}$ J $1\frac{1}{4}$

- ⑥ $-22 = 11 - 6a \rightarrow \frac{-33}{-6} = \frac{-6a}{-6} \rightarrow a = \frac{11}{2}$
- ⑦ $8t + 23 = 17 \rightarrow \frac{8t}{8} = \frac{-6}{8} \rightarrow t = \frac{-3}{4}$
- ⑧ $50 - 3u = 75 \rightarrow \frac{-25}{-3} = \frac{25}{-3} \rightarrow u = \frac{25}{-3}$
- ⑨ $21 = -10m - 3 \rightarrow \frac{24}{-10} = \frac{-10m}{-10} \rightarrow m = \frac{12}{5}$
- ⑩ $13x + 5x = 3 \rightarrow \frac{18x}{18} = \frac{3}{18} \rightarrow x = \frac{1}{6}$

Answers:

- E $-2\frac{2}{5}$ G $-1\frac{7}{10}$
- N $-8\frac{1}{3}$ T $-\frac{3}{4}$
- L $5\frac{1}{2}$ B $\frac{1}{6}$

- ⑪ $3x - 7 + 2x = 9 \rightarrow \frac{5x}{5} = \frac{16}{5} \rightarrow x = \frac{16}{5}$
- ⑫ $4 - 2y - y = 12 \rightarrow \frac{-2y}{-3} = \frac{8}{-3} \rightarrow y = \frac{8}{3}$
- ⑬ $-15 = 6p + 15 - 10p \rightarrow \frac{-30}{-4} = \frac{-4p}{-4} \rightarrow p = \frac{15}{2}$
- ⑭ $-n + 5 + 21n = 0 \rightarrow \frac{20n}{20} = \frac{-5}{20} \rightarrow n = \frac{-1}{4}$
- ⑮ $4e - 3e - 2e = 1 - 9 \rightarrow \frac{-1e}{-1} = \frac{-8}{-1} \rightarrow e = 8$

Answers:

- S $7\frac{1}{2}$ R $-2\frac{2}{3}$
- M $-6\frac{3}{4}$ X $3\frac{1}{5}$
- P 8 H $-\frac{1}{4}$

10	5	12	8	9	2	14	3	13	6	3	15	13	1	8		9	11	14	4	5	13	7	15	3	15	9			
H	E	B	U	R	N	E	D	H	I	S	L	I	P	S	O	N	T	H	E	X	H	A	U	S	T	P	I	P	E

EXTENDING

Two-Step Equations: Fractions

Solve each equation.

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

$\frac{7}{6}d = -\frac{5}{3}$ $-\frac{5}{3} \times \frac{6^2}{7} = -\frac{10}{7}$
 $\frac{7}{6}d \quad \frac{7}{6}$

$d = -\frac{10}{7} = -1\frac{3}{7}$

2) $5\frac{1}{2} - u = \frac{9}{4}$ $\frac{9}{4} - \frac{11}{2} = \frac{9}{4} - \frac{22}{4} = -\frac{13}{4}$
 $\quad -5\frac{1}{2} \quad -5\frac{1}{2}$

$-u = -\frac{13}{4}$
 $\nearrow \quad \nearrow$
 $u = \frac{13}{4} = 3\frac{1}{4}$

$u = \frac{13}{4} = 3\frac{1}{4}$

3) $-m - \frac{7}{8} = -10$ $-\frac{10}{1} + \frac{7}{8} = -\frac{80}{8} + \frac{7}{8} = -\frac{73}{8}$
 $\quad +\frac{7}{8} \quad +\frac{7}{8}$

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

$m = \frac{73}{8} = 9\frac{1}{8}$

4) $\frac{2}{7} = \frac{4}{5} + 9q$ $\frac{2}{7} - \frac{4}{5} = \frac{10}{35} - \frac{28}{35} = -\frac{18}{35}$
 $\quad -\frac{4}{5} \quad -\frac{4}{5}$

$-\frac{18}{35} = 9q$

$q = -\frac{2}{35}$

5) $2\frac{2}{5} = \frac{3}{8} + \frac{h}{\left(\frac{1}{3}\right)}$ $\frac{12}{5} - \frac{3}{8} = \frac{96}{40} - \frac{15}{40} = \frac{81}{40}$
 $\quad -\frac{3}{8} \quad -\frac{2}{8}$

$\frac{27}{40} \times \frac{1}{3} = \frac{h}{\left(\frac{1}{3}\right)} \times \frac{1}{3}$

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

6) $\frac{5}{9}c - \frac{3}{4} = \frac{7}{9}c$
 $\quad -\frac{5}{9}c \quad -\frac{5}{9}c$

$-\frac{3}{4} = \frac{2}{9}c$ $-\frac{3}{4} \times \frac{9}{2} = -\frac{27}{8}$
 $\frac{-3}{4} \quad \frac{2}{9}$

$c = -\frac{27}{8} = -3\frac{3}{8}$

7) $\frac{9}{4}(w - \frac{1}{9}) = \frac{7}{2}$ $\frac{7}{2} \times \frac{4^2}{9} = \frac{14}{9}$
 $\quad \frac{9}{4} \quad \frac{9}{4}$

$w - \frac{1}{9} = \frac{14}{9}$
 $\quad +\frac{1}{9} \quad +\frac{1}{9}$

$w = \frac{15}{9} = 1\frac{6}{9} = 1\frac{2}{3}$

8) $\frac{y}{\left(\frac{5}{3}\right)} + 5 = 2\frac{5}{6}$ $\frac{17}{6} - \frac{5}{1} = \frac{17}{6} - \frac{30}{6} = -\frac{13}{6}$
 $\quad -5 \quad -5$

$\frac{5}{3} \times \frac{y}{\left(\frac{5}{3}\right)} = -\frac{13}{6} \times \frac{5}{3}$ $-\frac{13}{6} \times \frac{5}{3} = -\frac{65}{18}$

$y = -\frac{65}{18} = -3\frac{11}{18}$

9) $-\frac{2}{3}p + \frac{8}{3} = -3p$ $-\frac{2}{1} + \frac{2}{3} = -\frac{9}{3} + \frac{2}{3} = -\frac{7}{3}$
 $\quad +\frac{2}{3}p \quad +\frac{2}{3}p$

$\frac{8}{3} = -\frac{7}{3}p$ $\frac{8}{3} \times -\frac{3}{7} = -\frac{8}{7}$
 $\frac{-8}{3} \quad \frac{-7}{3}$

$p = -\frac{8}{7} = -1\frac{1}{7}$

10) $-2\frac{1}{7}n - \frac{6}{7} = -1\frac{3}{7}$ $-\frac{10}{7} + \frac{6}{7} = -\frac{4}{7}$
 $\quad +\frac{6}{7} \quad +\frac{6}{7}$

$-2\frac{1}{7}n = -\frac{4}{7}$ $-\frac{4}{7} \times -\frac{7}{15} = \frac{4}{15}$
 $\frac{-4}{7} \quad \frac{-2}{7}$

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

$\frac{2}{54} \times \frac{65}{11} = \frac{13}{11}$

$3 \sqrt[3]{\frac{81}{40}}$
 $\frac{3}{1} \times \frac{27}{40} = \frac{81}{40}$

Two-Step Equations: Decimals

Sheet 1

Solve each equation.

1) $0.4x + 2.9 = 1.5$

$$\begin{array}{r} 0.4x + 2.9 = 1.5 \\ -2.9 \quad -2.9 \\ \hline 0.4x = -1.4 \\ \hline 0.4 \quad 0.4 \end{array}$$

$$\boxed{x = -3.5}$$

$$\begin{array}{r} 2.9 \\ -1.5 \\ \hline 1.4 \\ 0.4 \overline{) 1.4.0} \\ \underline{-1.2} \\ 2.0 \end{array}$$

2) $\frac{v}{2.2} - 0.1 = 7.4$

$$+0.1 \quad +0.1$$

$$2.2 \times \frac{v}{2.2} = 7.5 \times 2.2$$

$$\begin{array}{r} 7.5 \\ \times 2.2 \\ \hline 150 \\ 1500 \\ \hline 16.50 \end{array}$$

$$\boxed{v = 16.5}$$

3) $3x - 7 = \frac{a - 9.2}{3} \times 3$

$$\begin{array}{r} 21 = a - 9.2 \\ +9.2 \quad +9.2 \end{array}$$

$$\boxed{30.2 = a}$$

4) $-1.3g + 1.9 = -11.1$

$$-1.9 \quad -1.9$$

$$\begin{array}{r} -1.3g = -13 \\ -1.3 \quad -1.3 \end{array}$$

$$\boxed{g = 10}$$

5) $-0.9p + 3.2 = -1.7p$

$$+0.9p \quad +0.9p$$

$$\begin{array}{r} 3.2 = -0.8p \\ -0.8 \quad -0.8 \end{array}$$

$$\boxed{p = 4}$$

$$\begin{array}{r} 0.9 \overline{) 3.2} \\ \underline{-3.2} \\ 0 \end{array}$$

6) $-14.3 = -1.4 - 3d$

$$+1.4 \quad +1.4$$

$$\begin{array}{r} -12.9 = -3d \\ -3 \quad -3 \end{array}$$

$$\boxed{d = 4.3}$$

$$\begin{array}{r} 3 \overline{) 12.9} \\ \underline{-12} \\ 0.9 \\ \underline{-0.9} \\ 0 \end{array}$$

7) $14.2 = 2(-5.8 + t)$

$$\begin{array}{r} 7.1 = -5.8 + t \\ +5.8 \quad +5.8 \end{array}$$

$$\boxed{t = 12.9}$$

8) $0.5x - 10.6 = \frac{m + 11.7}{0.5} \times 0.5$

$$\begin{array}{r} -5.3 = m + 11.7 \\ -11.7 \quad -11.7 \end{array}$$

$$\boxed{m = -17}$$

$$\begin{array}{r} 10.6 \\ \times 0.5 \\ \hline 5.30 \end{array}$$

9) $\frac{k}{3.5} + 7.4 = 8$

$$-7.4 \quad -7.4$$

$$3.5 \times \frac{k}{3.5} = 0.6 \times 3.5$$

$$\boxed{k = 2.1}$$

$$\begin{array}{r} 3 \\ 3.5 \\ \times 0.6 \\ \hline 2.10 \end{array}$$

10) $-5.1 - z = 6.5$

$$+5.1 \quad +5.1$$

$$\begin{array}{r} -1z = 11.6 \\ \div -1 \quad \div -1 \end{array}$$

$$\boxed{z = -11.6}$$