

Section 1-3 Problem Examples p21

#6:

$$\begin{aligned}
 7y + 4 &= 3 - 2y \\
 \underline{2y} \quad \quad \underline{2y} & \quad \text{add } 2y \text{ to both sides} \\
 9y + 4 &= 3 \\
 \underline{-4} \quad \underline{-4} & \quad \text{subtract } 4 \text{ from both sides} \\
 9y &= -1 \\
 \frac{9y}{9} &= \frac{-1}{9} \quad \text{divide through by } 9 \\
 y &= \frac{-1}{9}
 \end{aligned}$$

#16:

$$\begin{aligned}
 10(1-2y) &= -5(2y-1) \\
 10(1-2y) &= 5(1-2y) \\
 \underline{-5(1-2y)} \quad \underline{-5(1-2y)} & \quad \text{subtract } 5(1-2y) \text{ from both sides} \\
 5(1-2y) &= 0 \\
 5-10y &= 0 \quad \text{distribute } 5 \text{ over } 1-2y \\
 \underline{-5} \quad \quad \underline{-5} & \quad \text{subtract } 5 \text{ from both sides} \\
 -10y &= -5 \\
 \frac{-10y}{-10} &= \frac{-5}{-10} \quad \text{divide by } -10 \\
 y &= \frac{1}{2}
 \end{aligned}$$

#20: Solve for r .

$$\begin{aligned}
 I &= prt \\
 \frac{I}{pt} &= \frac{prt}{pt} \quad \text{divide by } pt \\
 \frac{I}{pt} &= r
 \end{aligned}$$

#24: Solve for x .

$$\begin{aligned}
 \frac{x-2}{2} &= m+n \\
 2\left(\frac{x-2}{2}\right) &= 2(m+n) \quad \text{multiply both sides by } 2 \\
 x-2 &= 2(m+n) \\
 x-2 &= 2(m+n) \\
 \underline{\quad 2 \quad \quad \quad 2} & \quad \text{add } 2 \text{ to both sides} \\
 x &= 2(m+n)+2
 \end{aligned}$$

#36:

$$0.2(x+3) - 4(2x-3) = 3.4$$

$$0.2x + 0.6 - 8x + 12 = 3.4 \quad \text{distribute}$$

$$0.2x - 8x + 0.6 + 12 = 3.4 \quad \text{combine like terms}$$

$$-7.8x + 12.6 = 3.4 \quad \text{add like terms}$$

$$-7.8x + 12.6 - 12.6 = 3.4 - 12.6 \quad \text{subtract 12.6 from both sides}$$

$$-7.8x = -9.2$$

$$\frac{-7.8x}{-7.8} = \frac{-9.2}{-7.8} \quad \text{divide both sides by -7.8}$$

$$x \cong 1.18$$

#38:

$$3(m-2) - 5 = 8 - 2(m-4)$$

$$9m - 18 - 5 = 8 - 2m + 8 \quad \text{distribute}$$

$$9m - 23 = 16 - 2m \quad \text{add like terms}$$

$$9m - 23 + 23 = 16 - 2m + 23 \quad \text{add 23 to both sides}$$

$$9m = 39 - 2m$$

$$9m + 2m = 39 - 2m + 2m \quad \text{add } 2m \text{ to both sides}$$

$$11m = 39$$

$$\frac{11m}{11} = \frac{39}{11} \quad \text{divide both sides by 11}$$

$$m = \frac{39}{11}$$

#40:

$$\frac{x}{2} + \frac{x}{5} + \frac{x}{3} = 31$$

$$30\left(\frac{x}{2} + \frac{x}{5} + \frac{x}{3}\right) = 30(31) \quad \text{find } LCM(2,5,3) = 2^1 \times 5^1 \times 3^1 = 30 \text{ and multiply both sides by 30}$$

$$15x + 6x + 10x = 930$$

$$31x = 930 \quad \text{add like terms}$$

$$\frac{31x}{31} = \frac{930}{31} \quad \text{divide both sides by 31}$$

$$x = 30$$

#44: $S = 2\pi r^2 + 2\pi rh$ for h .
 $S - 2\pi r^2 = 2\pi r^2 + 2\pi rh - 2\pi r^2$ subtract $2\pi r^2$ from both sides
 $S - 2\pi r^2 = 2\pi rh$
 $\frac{S - 2\pi r^2}{2\pi r} = \frac{2\pi rh}{2\pi r}$ divide both sides by $2\pi r$
 $\frac{S - 2\pi r^2}{2\pi r} = h$

#46: $v = s^2 + \frac{1}{2}sh$ for h .
 $v - s^2 = s^2 + \frac{1}{2}sh - s^2$ subtract s^2 from both sides
 $v - s^2 = \frac{1}{2}sh$
 $2(v - s^2) = 2\left(\frac{1}{2}sh\right)$ multiply both sides by 2
 $2v - 2s^2 = sh$
 $\frac{2v - 2s^2}{s} = \frac{sh}{s}$ divide both sides by s
 $\frac{2v - 2s^2}{s} = h$

#56: $bx + a = dx + c$ solve for x and state restrictions.
 $bx + a - dx = dx + c - dx$ subtract dx from both sides
 $bx - dx + a = c$
 $bx - dx + a - a = c - a$ subtract a from both sides
 $bx - dx = c - a$ subtract a from both sides
 $(b - d)x = c - a$ distributive law
 $\frac{(b - d)x}{b - d} = \frac{c - a}{b - d}$ divide both sides by $b - d$
 $x = \frac{c - a}{b - d}$

We have the restriction $b \neq d$.

#58: $a(x - 3) + 8 = b(x - 1)$ solve for x and state restrictions.

$$\begin{aligned}
ax - 3a + 8 &= bx - b && \text{distribute} \\
ax - 3a + 8 - bx &= bx - b - bx && \text{subtract } bx \text{ from both sides} \\
ax - bx - 3a + 8 &= -b \\
ax - bx - 3a + 3a + 8 &= -b + 3a && \text{add } 3a \text{ to both sides} \\
ax - bx + 8 &= -b + 3a \\
ax - bx + 8 - 8 &= -b + 3a - 8 && \text{subtract 8 from both sides} \\
ax - bx &= -b + 3a - 8 \\
(a - b)x &= -b + 3a - 8 && \text{distributive law} \\
\frac{(a - b)x}{a - b} &= \frac{-b + 3a - 8}{a - b} && \text{divide by } a - b \\
x &= \frac{-b + 3a - 8}{a - b}
\end{aligned}$$

#56: $a(3tx - 2b) = c(dx - 2)$ solve for x and state restrictions.

$$\begin{aligned}
3atx - 2ab &= cdx - 2c && \text{distribute} \\
3atx - 2ab - cdx &= cdx - 2c - cdx && \text{subtract } cdx \text{ from both sides} \\
3atx - 2ab - cdx &= -2c \\
3atx - 2ab - cdx + 2ab &= -2c + 2ab && \text{add } 2ab \text{ to both sides} \\
3atx - cdx &= -2c + 2ab \\
(3at - cd)x &= -2c + 2ab && \text{distributive law} \\
\frac{(3at - cd)x}{3at - cd} &= \frac{-2c + 2ab}{3at - cd} && \text{divide both sides by } 3at - cd \\
x &= \frac{-2c + 2ab}{3at - cd} && \text{divide both sides by } 3at - cd
\end{aligned}$$