

Fully-worked Solutions

Practice 3

Formative Practice

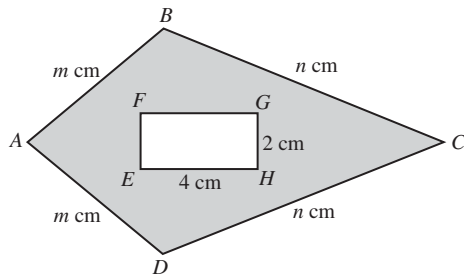
1 $v = 10t^2y - 165$
 When $v = 315$, $y = 3$,
 $315 = 10t^2(3) - 165$
 $480 = 30t^2$
 $t^2 = 16$
 $t = 4$

Answer: A

2 (a) $m = p^2$
 (b) $k = 3(r + x)$
 (c) $z = y - w$
 (d) $s = \frac{a}{\sqrt{x}}$

3 $s = 500 + 2h$

4



(a) $P = 2m + 2n + 2(4 + 2)$
 $= 2m + 2n + 12$
 $= 2(m + n + 6)$ cm

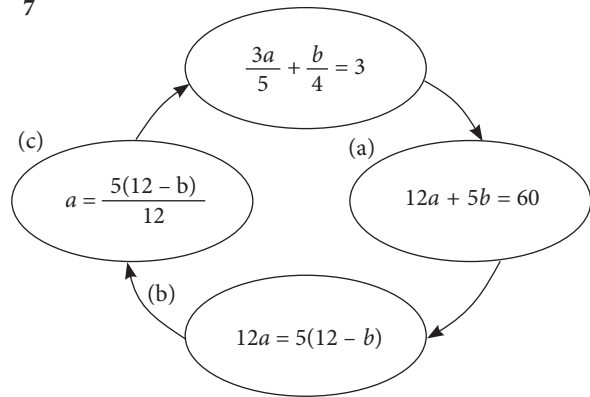
(b) $L = \frac{1}{2}xy - 4(2)$
 $= \frac{1}{2}xy - 8$
 $= \frac{1}{2}(xy - 16)$ cm²

5 (a) $10 = 3 \times 1 + 7$
 $13 = 3 \times 2 + 7$
 $16 = 3 \times 3 + 7$
 $19 = 3 \times 4 + 7$

(b) $y = 3x + 7$

6 (a) k (b) y
 (c) m (d) w

7



8 $\frac{m}{m - ny} = 2$
 $m = 2(m - ny)$
 $m = 2m - 2ny$
 $m = \frac{2ny}{3}$ [X]
 $n = \frac{m}{2y}$ [✓]
 $y = \frac{m}{2n}$ [✓]

9 $3k + 4 = 4m^2$
 $3k = 4(m^2 - 1)$
 $k = \frac{4(m^2 - 1)}{3}$

10 $\frac{v}{2 - \sqrt{w}} = 4$
 $\frac{v}{4} = 2 - \sqrt{w}$
 $\sqrt{w} = 2 - \frac{v}{4}$
 $w = \left(2 - \frac{v}{4}\right)^2$

Answer: D

11 (a) $\sqrt[3]{1 - \frac{x}{4y}} = \frac{1}{2}w$
 $1 - \frac{x}{4y} = \left(\frac{1}{2}w\right)^3$
 $1 - \frac{x}{4y} = \frac{1}{8}w^3$
 $\frac{x}{4y} = 1 - \frac{1}{8}w^3$
 $\frac{x}{4y} = \frac{8 - w^3}{8}$
 $x = 4y\left(\frac{8 - w^3}{8}\right)$
 $x = \frac{y(8 - w^3)}{2}$

$$(b) y = \frac{2x}{8 - w^3}$$

$$12 \quad w = \frac{13s - 15t}{2}$$

$$(a) \text{ When } s = 6, t = -8,$$

$$\begin{aligned} w &= \frac{13(6) - 15(-8)}{2} \\ &= \frac{78 + 120}{2} \\ &= \frac{198}{2} \\ &= 99 \end{aligned}$$

$$(b) \text{ When } t = 1, w = -27,$$

$$\begin{aligned} -27 &= \frac{13s - 15(1)}{2} \\ -54 &= 13s - 15 \\ 13s &= -39 \\ s &= -3 \end{aligned}$$

$$(c) \text{ When } s = 1, w = -31,$$

$$\begin{aligned} -31 &= \frac{13(1) - 15t}{2} \\ -62 &= 13 - 15t \\ 15t &= 75 \\ t &= 5 \end{aligned}$$

$$13 \quad 3pr = \frac{1}{4}y$$

$$(a) \text{ When } p = 1, r = 2,$$

$$\begin{aligned} 3(1)(2) &= \frac{1}{4}y \\ 6 &= \frac{1}{4}y \\ y &= 24 \end{aligned}$$

$$(b) \text{ When } p = 4, y = 8,$$

$$\begin{aligned} 3(4)r &= \frac{1}{4}(8) \\ 12r &= 2 \\ r &= \frac{1}{6} \end{aligned}$$

$$(c) \text{ When } y = 40, r = 5,$$

$$\begin{aligned} 3p(5) &= \frac{1}{4}(40) \\ 15p &= 10 \\ p &= \frac{2}{3} \end{aligned}$$

$$(d) 3pr = \frac{1}{4}y$$

$$p = \frac{y}{12r}$$

$$14 \quad s = ut - 4.9t^2$$

$$(a) \text{ When } u = 24, t = 3,$$

$$\begin{aligned} s &= 24(3) - 4.9(3)^2 \\ &= 72 - 44.1 \\ &= 27.9 \end{aligned}$$

$$(b) \text{ When } s = 52.5, t = 5,$$

$$\begin{aligned} 52.5 &= u(5) - 4.9(5)^2 \\ 52.5 &= 5u - 122.5 \\ 5u &= 175 \\ u &= 35 \end{aligned}$$

Summative Practice

$$1 \quad 4ry = 7r + 12y$$

$$4ry - 12y = 7r$$

$$4y(r - 3) = 7r$$

$$y = \frac{7r}{4(r - 3)}$$

Answer: D

$$2 \quad \frac{1 - 7p}{q} = 4p$$

$$1 - 7p = 4pq$$

$$1 = 4pq + 7p$$

$$1 = p(4q + 7)$$

$$p = \frac{1}{4q + 7}$$

Answer: C

$$3 \quad \frac{2}{y} - \frac{1}{2}x = \frac{3}{10x}$$

$$\frac{2}{y} = \frac{3}{10x} + \frac{1}{2}x$$

$$\frac{2}{y} = \frac{3 + 5x^2}{10x}$$

$$\frac{y}{2} = \frac{10x}{3 + 5x^2}$$

$$y = \frac{20x}{3 + 5x^2}$$

Answer: C

$$4 \quad w - 2 = \frac{4w}{\sqrt{k} + 2}$$

$$\sqrt{k} + 2 = \frac{4w}{w - 2}$$

$$\sqrt{k} = \frac{4w}{w - 2} - 2$$

$$\sqrt{k} = \frac{4w - 2(w - 2)}{w - 2}$$

$$\sqrt{k} = \frac{4w - 2w + 4}{w - 2}$$

$$\sqrt{k} = \frac{2w + 4}{w - 2}$$

$$\sqrt{k} = \frac{2(w + 2)}{w - 2}$$

$$k = 4 \left(\frac{w + 2}{w - 2} \right)^2$$

Answer: D

$$5 \quad \sqrt{4m - 1} = 3 \sqrt{\frac{m - 2t}{6}}$$

$$4m - 1 = 9 \left(\frac{m - 2t}{6} \right)$$

$$4m - 1 = 3 \left(\frac{m - 2t}{2} \right)$$

$$2(4m - 1) = 3(m - 2t)$$

$$8m - 2 = 3m - 6t$$

$$6t = 2 - 5m$$

$$t = \frac{2 - 5m}{6}$$

Answer: D

$$6 \quad \frac{6p + mn}{3m - np} = \frac{3}{4}$$

$$4(6p + mn) = 3(3m - np)$$

$$24p + 4mn = 9m - 3np$$

$$24p + 3np = 9m - 4mn$$

$$3p(8 + n) = m(9 - 4n)$$

$$p = \frac{m(9 - 4n)}{3(8 + n)}$$

$$7 \quad (a) \quad 4 = 2\sqrt{2k + 7r} - 3r$$

$$4 + 3r = 2\sqrt{2k + 7r}$$

$$(4 + 3r)^2 = 4(2k + 7r)$$

$$16 + 24r + 9r^2 = 8k + 28r$$

$$16 - 4r + 9r^2 = 8k$$

$$k = \frac{1}{8}(16 - 4r + 9r^2)$$

(b) When $r = 6$,

$$k = \frac{1}{8}[16 - 4(6) + 9(6)^2]$$

$$= \frac{1}{8}(16 - 24 + 324)$$

$$= \frac{1}{8}(316)$$

$$= 39.5$$

8 (a) $S = 2(ab + bc + ac)$

(b) When $b = 3$, $c = 2$, $S = 112$,

$$112 = 2(3a + 6 + 2a)$$

$$112 = 2(5a + 6)$$

$$112 = 10a + 12$$

$$100 = 10a$$

$$a = 10$$