

ANSWERS/SOLUTIONS

A. ① 8a

② 2a

③ 5a

④ 4x

⑤ 0

⑥ 0

⑦ 2a+7c

⑧ 5x+2y

⑨ 2x+1

⑩ 2x+5y

⑪ 6y

⑫ 3x+2y

⑬ 0

⑭ 3p+2q

⑮ -p

⑯ 2c-2d

⑰ 7x-7y

⑱ p+q+7

⑲ ac

⑳ 2xy

㉑ 7xy

㉒ 6xy

㉓ 0

㉔ 1

㉕ -2ab

㉖ y²

㉗ 3x³

㉘ 2x²

㉙ y²+y

㉚ -3x²+2x+8

㉛ 3x²

㉜ 5x²

㉝ x²

㉞ 2x²y+xy

㉟ 3xy²

B.

① $4x-12$ ② $8x-12$ ③ $6-8y$ ④ x^2+x

⑤ x^2-2x ⑥ x^3+4x^2-3x ⑦ $xy-y^3$

⑧ $4p+8+6p-9$
 $= 10p-1$ ⑨ $6p+4+6p-9$
 $= 12p-5$

⑩ $6p-15+6p-6$
 $= 12p-21$ ⑪ $2p^2+4p+6p^2-9p$
 $= 8p^2-5p$

⑫ $3p^2-6p+6p^2-4p$
 $= 9p^2-10p$ ⑬ $2p^2-6p+9p^2-6p$
 $= 11p^2-12p$

⑭ $x^3-2xy+3x^3+6x^2y$
 $= 4x^3-2xy+6x^2y$ ⑮ $-x+3x$

⑯ $-8x+12$ ⑰ $-6+8y$ ⑱ $-x^2-x$

⑲ $-x^2+2x$ ⑳ $-x^3-4x^2+3x$

㉑ $-xy+y^3$ ㉒ $7p+14-6p+9$
 $= p+23$

㉓ $6p+4-6p+9$
 $= 13$ ㉔ $6p-15-6p+6$
 $= -9$

㉕ $2p^2+4p-6p^2+9p$
 $= -4p^2+13p$ ㉖ $3p^2-6p-6p^2+4p$
 $= -3p^2-2p$

㉗ $2p^2-6p-9p^2+6p$
 $= -7p^2$ ㉘ $3x-6y-2x+6y$
 $= x$

$$\begin{aligned} (29) \quad & 6x + 2 - 10x + 15 \\ & = \underline{\underline{-4x + 17}} \end{aligned}$$

$$\begin{aligned} (30) \quad & x^3 - 2xy - 3x^3 - 6x^2y \\ & = \underline{\underline{-2x^3 - 2xy - 6x^2y}} \end{aligned}$$

$$\begin{aligned} (31) \quad & 6x + 2 - 2x + 3 \\ & = \underline{\underline{4x + 5}} \end{aligned}$$

$$\begin{aligned} (32) \quad & 2p - 8 + 6p - 3 \\ & = \underline{\underline{8p - 11}} \end{aligned}$$

$$\begin{aligned} (33) \quad & a^2 + \cancel{2ab} - \cancel{3ac} + \cancel{3ca} - \cancel{6cb} + 9c^2 - \cancel{2ba} + \cancel{2b^2} + \cancel{6bc} \\ & = \underline{\underline{a^2 + 9c^2 + 2b^2}} \end{aligned}$$

$$\begin{aligned} (34) \quad & \cancel{ab} - \cancel{ac} + \cancel{ad} - \cancel{ab} + \cancel{ac} - \cancel{ad} \text{ or } \begin{array}{l} \text{let } b - c + d = 2 \\ ax - ax = 0 \end{array} \\ & = \underline{\underline{0}} \end{aligned}$$

$$\begin{aligned} (35) \quad & \cancel{6ab} - 9ac + \cancel{12ad} - \cancel{6ab} + 2ac - \cancel{12ad} \\ & = \underline{\underline{-7ac}} \end{aligned}$$

$$\begin{aligned} (36) \quad & 5 - 2x + 6 \\ & = \underline{\underline{11 - 2x}} \end{aligned}$$

$$\begin{aligned} (37) \quad & 6 + 12 - 4x \\ & = \underline{\underline{18 - 4x}} \end{aligned}$$

$$\begin{aligned} (38) \quad & 6 + 2x + 6 \\ & = \underline{\underline{12 + 2x}} \end{aligned}$$

$$\begin{aligned} (39) \quad & 6 - 2x - 6 \\ & = \underline{\underline{-2x}} \end{aligned}$$

$$\begin{aligned} (40) \quad & \cancel{8x^3y} - 10x^2 - \cancel{8yx^3} + 9x^2 \\ & = \underline{\underline{-x^2}} \end{aligned}$$

C.

$$\textcircled{1} \quad x = 9 - 3 = \underline{\underline{6}}$$

$$\textcircled{2} \quad x = \frac{6}{2} = \underline{\underline{3}}$$

$$\textcircled{3} \quad 4 - 5 = x \\ \underline{\underline{-1 = x}}$$

$$\textcircled{4} \quad 2x = 13 - 3 \\ 2x = 10 \\ \underline{\underline{-x = 5}}$$

$$\textcircled{5} \quad x = \underline{\underline{\frac{1}{2}}}$$

$$\textcircled{6} \quad x = \underline{\underline{\frac{2}{3}}}$$

$$\textcircled{7} \quad \underline{\underline{x = 5}}$$

$$\textcircled{8} \quad 4x = 20 \\ \underline{\underline{x = 5}}$$

$$\textcircled{9} \quad \underline{\underline{x = -5}}$$

$$\textcircled{10} \quad \underline{\underline{x = -3}}$$

$$\textcircled{11} \quad \underline{\underline{x = -2}}$$

$$\textcircled{12} \quad x = \underline{\underline{-\frac{1}{4}}}$$

$$\textcircled{13} \quad 2x = -8 \\ \underline{\underline{x = -4}}$$

$$\textcircled{14} \quad 2x = 8 \\ \underline{\underline{x = 4}}$$

$$\textcircled{15} \quad 2x - x = 2 + 3 \\ \underline{\underline{x = 5}}$$

$$\textcircled{16} \quad 7x - 2x = 12 + 3 \\ 5x = 15 \\ \underline{\underline{x = 3}}$$

$$\textcircled{17} \quad 7y - 5y = 2 + 8 \\ 2y = 10 \\ \underline{\underline{y = 5}}$$

$$\textcircled{18} \quad 4x - 2x = -11 - 5 \\ 2x = -16 \\ \underline{\underline{x = -8}}$$

$$\textcircled{19} \quad 5x - 2x = -15 + 6 \\ 3x = -9 \\ \underline{\underline{x = -3}}$$

$$\textcircled{20} \quad 3x = -15 \\ \underline{\underline{x = -5}}$$

$$\textcircled{21} \quad -5 + 7 = 4x - 3x \\ \underline{\underline{2 = x}}$$

$$\textcircled{22} \quad 7 + 3 = 5x - 2x \\ 10 = 3x \\ \underline{\underline{3\frac{1}{3}}} = \underline{\underline{\frac{10}{3}}} = x \text{ both acceptable}$$

$$\begin{aligned} (23) \quad 2x + 3x &= 12 - 7 \\ 5x &= 5 \\ \underline{x} &= \underline{1} \end{aligned}$$

$$\begin{aligned} (24) \quad -2 + 5 &= 8y - 6y \\ 3 &= 2y \\ \underline{1.5} &= \underline{\frac{3}{2}} = \underline{y} \end{aligned}$$

$$\begin{aligned} (25) \quad 8 - 10 &= -2x + 4x \\ -2 &= 2x \\ \underline{-1} &= \underline{x} \end{aligned}$$

$$\begin{aligned} (26) \quad 12 + 6 &= 3x \\ 18 &= 3x \\ \underline{6} &= \underline{x} \end{aligned}$$

$$\begin{aligned} (27) \quad 3x - 15 &= 12 \quad \text{OR} \quad (x - 5) = \frac{12}{3} = 4 \\ 3x &= 27 & x &= 4 + 5 = 9 \\ \underline{x} &= \underline{9} & & \end{aligned}$$

$$\begin{aligned} (28) \quad 10x - 15 &= 15 \quad \text{OR} \quad 2x - 3 = \frac{15}{5} = 3 \\ 10x &= 30 & 2x &= 6 \\ \underline{x} &= \underline{3} & \underline{x} &= \underline{3} \end{aligned}$$

$$\begin{aligned} (29) \quad 15 - 10x &= 30 \quad \text{OR} \quad 3 - 2x = \frac{30}{5} = 6 \\ 15 - 30 &= 10x & 3 - 6 &= 2x \\ -15 &= 10x & -3 &= 2x \\ \underline{-1.5} &= \underline{-\frac{15}{10}} = \underline{x} & \underline{-\frac{3}{2}} &= \underline{x} \end{aligned}$$

$$\begin{aligned} (30) \quad 6x - 12 &= 8 \\ 6x &= 20 \\ \underline{x} &= \underline{\frac{20}{6}} = \underline{\frac{10}{3}} = \underline{3\frac{1}{3}} \end{aligned}$$

$$\begin{aligned} (31) \quad 7x + 2 &= 5x - 10 \\ 7x - 5x &= -10 - 2 \\ 2x &= -12 \\ \underline{x} &= \underline{-6} \end{aligned}$$

$$\begin{aligned} (32) \quad 22 - 3x &= 2x + 12 \\ 22 - 12 &= 2x + 3x \\ 10 &= 5x \\ \underline{2} &= \underline{x} \end{aligned}$$

$$\begin{aligned} (33) \quad 13 - 3x &= 4x - 8 \\ 13 + 8 &= 4x + 3x \\ 21 &= 7x \\ \underline{3} &= \underline{x} \end{aligned}$$

$$\begin{aligned} (34) \quad x - 18 &= 2(2x - 3) \\ x - 18 &= 4x - 6 \\ -18 + 6 &= 4x - x \\ -12 &= 3x \\ \underline{-4} &= \underline{x} \end{aligned}$$

$$\begin{aligned} (35) \quad 8x - 12 &= 3x - 27 \\ 8x - 3x &= -27 + 12 \\ 5x &= -15 \\ \underline{x} &= \underline{-3} \end{aligned}$$

$$(36) \quad 6x - 15 = 6 + 2x - 6$$

$$6x - 2x = 15$$

$$4x = 15$$

$$x = \frac{15}{4} \text{ OR } 3\frac{3}{4}$$

$$(37) \quad 4 - 3x + 5 = 6 - 2x - 7$$

$$4 + 5 - 6 + 7 = -2x + 3x$$

$$10 = x$$

$$(38) \quad x^2 + 5x = x^2 - 15$$

$$x^2 + 5x - x^2 = -15$$

$$5x = -15$$

$$x = -3$$

$$(39) \quad 6x + 3x^2 = 3x^2 - 2x - 24$$

$$6x + 3x^2 - 3x^2 + 2x = -24$$

$$8x = -24$$

$$x = -3$$

$$(40) \quad 3x - 12 - 2x + 10 = 6x - 2x + 10$$

$$x - 2 = 4x + 10$$

$$-2 - 10 = 4x - x$$

$$-12 = 3x$$

$$-4 = x$$

Applications

$$(1) \quad (a) \quad x + x + 5 + x + x + 5 \quad \text{OR} \quad 2(x + x + 5)$$
$$= 4x + 10 \quad = 2(2x + 5)$$
$$= 4x + 10$$

$$(b) \quad 4x + 10 = 62$$
$$4x = 52$$
$$x = 13$$

$$\text{OR half the perimeter} = x + x + 5 = 31$$
$$2x = 26$$
$$x = 13$$

$$\text{The Length} = x + 5 = 13 + 5 = 18\text{cm}$$

$$\begin{aligned} \textcircled{2} \text{ (a)} \quad 2x + 10 &= 28 \quad \text{opposite sides equal.} \\ 2x &= 18 \\ \underline{x} &= \underline{9} \end{aligned}$$

$$\text{(b)} \quad \text{Hence the width} = x - 3 = 9 - 3 = 6 \text{ cm.}$$

$$L = 28, W = 6, \quad \text{Perimeter} = 2(28 + 6) = 2(34) = 68 \text{ cm}$$

$$\text{Area} = L \times W = 28 \times 6 = 168 \text{ cm}^2$$

$$\begin{aligned} \textcircled{3} \text{ (a)} \quad \text{Perimeter} &= 2r + 3 + 2r + 3 + r + 3 \\ &= \underline{5r + 9} \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad 5r + 9 &= 49 \\ 5r &= 40 \\ \underline{r} &= \underline{8} \end{aligned}$$

$$\text{(c)} \quad \text{angle } \hat{P}RQ = 2x + 30 \quad \text{isosceles triangle.}$$

$$\text{Sum of all 3 angles} = 180$$

$$2x + 30 + 2x + 30 + x = 180$$

$$5x + 60 = 180$$

$$5x = 120$$

$$x = \frac{120}{5} = \frac{240}{10} = \underline{\underline{24}}$$

$$\begin{aligned} \textcircled{4} \quad \text{Area of triangle} &= \frac{1}{2} \times b \times h = \frac{1}{2} \times 20 \times 15 = 150 \\ \text{area of rectangle} &= 10x \end{aligned}$$

$$10x = 150$$

$$x = \frac{150}{10} = \underline{\underline{15}}$$