

Practice Questions: Self-Study Answers

Q1

$$2x^\circ + x^\circ + 7x^\circ = 180^\circ \text{ (\angle sum of } \Delta)$$

$$10x = 180$$

$$x = 18$$

Smallest angle of triangle $A = 20^\circ$

Smallest angle of triangle $B = 18^\circ$

Since at least one pair of corresponding angles of the triangles is not equal, triangles A and B are not similar.

Q2

$$\frac{3w}{15} = \frac{w}{5}, \frac{5w}{20} = \frac{w}{4}, \frac{6w}{30} = \frac{w}{5}$$

Since the ratios of the corresponding sides of the triangles are not equal, triangles C and D are not similar.

Q3

$$(a) \quad \begin{aligned} \angle XYZ &= \angle ABC \\ &= 37^\circ \end{aligned}$$

$$\therefore \angle XZY = 180^\circ - 90^\circ - 37^\circ \text{ (\angle sum of } \Delta)$$
$$= 53^\circ$$

$$(b) \quad \begin{aligned} \frac{BC}{YZ} &= \frac{AC}{XZ} \\ BC &= \frac{3}{7.5} \times 12.5 \\ &= 5 \text{ m} \end{aligned}$$

$$\begin{aligned} \frac{XY}{AB} &= \frac{XZ}{AC} \\ XY &= \frac{7.5}{3} \times 4 \\ &= 10 \text{ m} \end{aligned}$$

$$(c) \quad \begin{aligned} \text{Area of } \Delta ABC : \text{Area of } \Delta XYZ &= \frac{1}{2}(3)(4) : \frac{1}{2}(7.5)(10) \\ &= 12 : 75 \\ &= 4 : 25 \end{aligned}$$

Q4

$$(a) \quad \begin{aligned} \angle ZXY &= \angle CAB \\ &= 48^\circ \end{aligned}$$

$$(w + 16)^\circ + (2w - 10)^\circ + 48^\circ = 180^\circ \text{ (}\angle \text{ sum of } \Delta \text{)}$$

$$3w + 54 = 180$$

$$3w = 126$$

$$w = 42$$

(b) Method 1

$$\begin{aligned} \angle ABC &= \angle XYZ \\ &= (w + 16)^\circ \\ &= (42 + 16)^\circ \\ &= 58^\circ \end{aligned}$$

$$\begin{aligned} \angle ACB &= 180^\circ - 58^\circ - 48^\circ \text{ (}\angle \text{ sum of } \Delta \text{)} \\ &= 74^\circ \end{aligned}$$

Method 2

$$\begin{aligned} \angle ACB &= \angle XZY \\ &= (2w - 10)^\circ \\ &= (2 \times 42 - 10)^\circ \\ &= 74^\circ \end{aligned}$$

$$(c) \quad \begin{aligned} \frac{YZ}{BC} &= \frac{XY}{AB} \\ &= \frac{3.6}{2.4} \\ &= \frac{3}{2} \end{aligned}$$

Q5

(b) $\triangle WXY$ and $\triangle WQP$ are similar.

$$\therefore \frac{WX}{WQ} = \frac{WY}{WP} = \frac{XY}{QP}$$

$$\frac{XY}{21} = \frac{6}{16}$$

$$\begin{aligned} XY &= \frac{6}{16} \times 21 \\ &= 7.875 \text{ cm} \end{aligned}$$

$$(b) \quad \frac{12}{WQ} = \frac{6}{16}$$

$$\begin{aligned} WQ &= 12 \times \frac{16}{6} \\ &= 32 \text{ cm} \end{aligned}$$

$$\begin{aligned} QY &= WQ - WY \\ &= 32 - 6 \\ &= 26 \text{ cm} \end{aligned}$$

Q6

- (a) (i) $\triangle ABC$ and $\triangle ADE$ are similar.
 $\therefore \angle ACB = \angle AED$
 $= 4x^\circ$

In $\triangle ABC$,
 $4x^\circ + x^\circ + 120^\circ = 180^\circ$ (\angle sum of \triangle)
 $5x = 60$
 $x = 12$

(ii) $\angle ACB = 4x^\circ$
 $= 4 \times 12^\circ$
 $= 48^\circ$

(iii) $\angle ADE = \angle ABC$
 $= x^\circ$
 $= 12^\circ$

- (b) BC is parallel to DE .

Q7

(a) $\angle ACB = 180^\circ - 90^\circ - 20^\circ$ (\angle sum of \triangle)
 $= 70^\circ$
 $\angle BDE = \angle ACB$ (corr. \angle s of similar \triangle s)
 $= 70^\circ$

(b) $\angle EBD = \angle BAC$ (corr. \angle s of similar \triangle s)
 $= 20^\circ$
 $\angle CXD = \angle EBD + \angle ACB$ (ext. \angle of \triangle)
 $= 38^\circ + 52^\circ$
 $= 90^\circ$

(c) Scale factor of enlargement $= \frac{BC}{ED}$
 $= \frac{9.75}{6.5}$
 $= 1.5$

(d) $\frac{BE}{AB} = \frac{ED}{BC}$ (corr. sides of similar \triangle s)
 $\frac{BE}{15.6} = \frac{6.5}{9.75}$
 $BE = \frac{6.5}{9.75} \times 15.6$
 $= 10.4 \text{ cm}$
Area of $\triangle BED = \frac{1}{2} \times 10.4 \times 6.5$
 $= 33.8 \text{ cm}^2$

Q8 Rotational symmetry of order 3

Q9

$$\frac{5}{8} = \frac{6}{6+CQ}$$

$$5(6+CQ) = 6 \times 8$$

$$6+CQ = 48 \div 5$$

$$CQ = 9.6 - 6 = 3.6$$

$$\frac{CR}{10} = \frac{3.6}{3.6+6}$$

$$9.6CR = 3.6 \times 10$$

$$CR = 36 \div 9.6 = 3.75$$

Q10 (a) $\triangle LMN \approx \triangle LCB$
 $\triangle AMN \approx \triangle ABC$

(b)(i) $\frac{BC}{8} = \frac{10}{6}$

$$BC = \frac{10}{6} \times 8$$

$$= 13\frac{1}{3} \text{ cm}$$

(ii) $\frac{AM}{AM+10} = \frac{8}{\left(13\frac{1}{3}\right)}$

$$13\frac{1}{3}AM = 8AM + 80$$

$$40AM = 24AM + 240$$

$$16AM = 240$$

$$AM = 15 \text{ cm}$$

11ai) 9 cm 11aii) 2025 11aiii) 160 11b) 850g

12) Radius = 7 cm

13)

24 cm

$\frac{27}{512}$

6.75 kg