

LC 2015 (SET B): PAPER 2

QUESTION 7 (35 MARKS)

Question 7 (a)

O

FORMULA: Enlargements

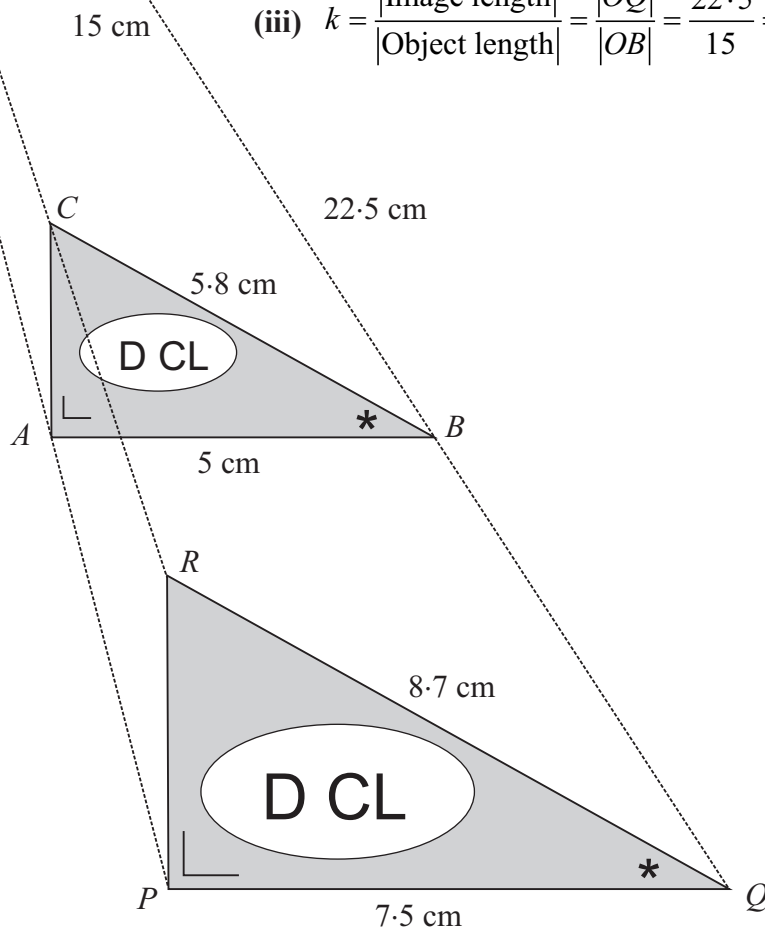
$$\text{Scale factor } k = \frac{|\text{Image length}|}{|\text{Object length}|}$$

$$k^2 = \frac{|\text{Image area}|}{|\text{Object area}|}$$

(i) Using a ruler, draw lines joining P to A , Q to B and R to C . They intersect at O , the centre of enlargement.

(ii) $|OB| = 15 \text{ cm}$, $|OQ| = 22.5 \text{ cm}$

(iii) $k = \frac{|\text{Image length}|}{|\text{Object length}|} = \frac{|OQ|}{|OB|} = \frac{22.5}{15} = \frac{3}{2} = 1.5$



MARKING SCHEME NOTES

Question 7 (a) (i) [Scale 15C (0, 4, 11, 15)]

- 4: • An attempt to draw any construction ray e.g. [Join B to Q]
 11: • Two construction rays drawn.
 • Construction rays drawn but centre not identified correctly

Question 7 (a) (ii) (iii) [Scale 10C (0, 4, 9, 10)]

Note: Accept tolerance of 5 mm Accept correct or consistent work from previous section

- 4: • One measurement correct.
 • Works with two sides of given triangles to get k e.g. $[k = \frac{|PQ|}{|AB|} = \frac{7.5}{5} = 1.5]$
 9: • Two measurements correct
 • Error in scale factor

Question 7 (b)

$$k^2 = \frac{|\text{Image area}|}{|\text{Object area}|} \Rightarrow 1.5^2 = \frac{|\text{Image area}|}{7.5}$$

$$\therefore |\text{Image area}| = 7.5 \times 1.5^2 = 16.875 \text{ cm}^2$$

MARKING SCHEME NOTES

Question 7 (b) [Scale 5B (0, 3, 5)]

- 3: • Use of an incorrect relevant formula [Use of k]
 • Leaves as $7.5 \times |1.5|^2$
 • Correct answer without use of scale factor $[|PQ| = \frac{|AB|}{k}]$
 • Correct answer without work

Question 7 (c) (i)

$$|\text{Object length}| = 5 \text{ cm}$$

$$k = 1.5$$

$$|\text{Image length}| = |PQ| = ?$$

$$1.5 = \frac{|PQ|}{5} \Rightarrow |PQ| = 5 \times 1.5 = 7.5 \text{ cm}$$

Question 7 (c) (ii)

$$|\text{Image length}| = |QR| = 8.7 \text{ cm}$$

$$k = 1.5$$

$$|\text{Object length}| = |BC| = ?$$

$$1.5 = \frac{|QR|}{|BC|} = \frac{8.7}{|BC|} \Rightarrow |BC| = \frac{8.7}{1.5} = 5.8 \text{ cm}$$

Question 7 (c) (iii)

$$\cos |\angle ABC| = \frac{5}{5.8} = \frac{25}{29} \Rightarrow |\angle ABC| = \cos^{-1} \left(\frac{25}{29} \right) = 30.45^\circ$$

$$\cos |\angle PQR| = \frac{7.5}{8.7} = \frac{25}{29} \Rightarrow |\angle PQR| = \cos^{-1} \left(\frac{25}{29} \right) = 30.45^\circ$$

FORMULAE AND TABLES BOOK

Trigonometry: Right-angled triangle [page 16]

$$\sin A = \frac{a}{c}, \cos A = \frac{b}{c}, \tan A = \frac{a}{b}$$

MARKING SCHEME NOTES

Question 7 (c) (i) (ii) (iii) [Scale 5D (0, 2, 3, 4, 5)]

Note: Accept correct or consistent from previous work

0: • Correct answer without work

2: • Any use of scale factor e.g. $|PQ| = \frac{|AB|}{k}$

3: • $|PQ|$ or $|BC|$ correct

4: • $|PQ|$ and $|BC|$ correct