

GCSE MATHS

Perimeter and area

Worked Solutions

Q1

★

$$P = 2(8 + 5) = 26 \text{ cm}$$

Add both lengths and both widths.

Q2

★

$$A = 7(4) = 28 \text{ cm}^2$$

Multiply length by width.

Q3

★★

$$s = 36/4 = 9 \text{ cm}$$

Find one side.

$$A = 9^2 = 81 \text{ cm}^2$$

Square the side length.

Q4

★

$$A = \frac{1}{2}(12)(7) = 42 \text{ cm}^2$$

Use the perpendicular height.

Q5

★★

$$45 = \frac{1}{2}(10)h$$

Substitute the base and area.

$$h = 45/5 = 9 \text{ cm}$$

Divide by five.

Q6

★★

$$35 \text{ cm} = 0.35 \text{ m}$$

Match the units.

$$A = 1.2(0.35) = 0.42 \text{ m}^2$$

Multiply in metres.

Q7

★★

$$A = 9(4) = 36 \text{ cm}^2$$

Use the perpendicular height, not the sloping side.

Q8

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$$b = 63/7 = 9 \text{ cm}$$

Divide area by height.

Q9

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$$A = \frac{1}{2}(6 + 10)(5) = 40 \text{ cm}^2$$

Average the parallel sides and multiply by the height.

Q10

$$60 = \frac{1}{2}(7 + 13)h = 10h$$

Substitute in the area formula.

$$h = 6 \text{ cm}$$

Divide by ten.

Q11

$$34 = \frac{1}{2}(6 + x)(4)$$

Substitute the known values.

$$17 = 6 + x \Rightarrow x = 11 \text{ cm}$$

Divide by two, then subtract six.

Q12

$$\frac{1}{2}bh = b(6)$$

Equate the areas.

$$h = 12 \text{ cm}$$

Cancel the positive base and double six.

Q13

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$$A = \pi(6)^2 = 36\pi \text{ cm}^2$$

Square the radius.

Q14

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$$C = \pi d = 14\pi \text{ cm}$$

Multiply the diameter by π .**Q15**

$$P = \pi r + 2r = 5\pi + 10 \text{ cm}$$

Add half the circumference and the diameter.

Q16

(a) $A = 12(4) + 4(4) = 64 \text{ cm}^2$

Split into a bottom rectangle and an upper-left square.

(b) Missing lengths = 8 cm and 8 cm

Subtract widths; add heights.

$$P = 12 + 4 + 8 + 4 + 4 + 8 = 40 \text{ cm}$$

Follow every outside edge.

Q17

$$A = 10(8) - \pi(2)^2 = 80 - 4\pi \text{ cm}^2$$

Subtract the hole area.

Q18

$$2x + 2(x + 3) = 34 \Rightarrow x = 7$$

Solve the perimeter equation.

$$A = 7(10) = 70 \text{ cm}^2$$

Multiply the two side lengths.

Q19

$$x(x + 4) = 96$$

Form an area equation.

$$(x + 12)(x - 8) = 0$$

Factorise the quadratic.

$$x = 8$$

Reject the negative width and add the sides.

$$P = 2(8 + 12) = 40 \text{ cm}$$

Q20

$$(12 - 2x)(8 - 2x) = 60$$

Subtract two path widths from each dimension.

$$4x^2 - 40x + 36 = 0$$

Expand and collect terms.

$$(x - 1)(x - 9) = 0$$

Divide by four and factorise.

$$x = 1 \text{ m}$$

The width must be less than 4 m, so reject 9.

Q21

$$a + b = 10$$

$$ab = 9, 16, 21, 24, 25$$

$$\text{Greatest area} = 25 \text{ cm}^2$$

Halve the perimeter.

Try pairs 1 and 9 through to 5 and 5.

The 5 cm square is largest.

Q22

$$A_{\text{square}} = 100$$

$$A_{\text{circle}} = 25\pi$$

$$\frac{100 - 25\pi}{100} = 1 - \frac{\pi}{4}$$

The circle radius is 5 cm.

Divide the outside area by the square area.

Q23

$$h_1 + h_2 = 6$$

$$A_1 + A_2 = \frac{1}{2}(8)(h_1 + h_2) = 24 \text{ cm}^2$$

The heights span the distance between the parallel sides.

Add the two triangle areas.