

CLASS 8

MATHS

EXTRA QUESTIONS

## Extra Questions for Class 8 Maths Chapter 14: Area – HOTS

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Fresh HOTS-level extra questions for Class 8 Maths Chapter 14 (Area), with numbers not found in the NCERT book. Full worked solutions included.

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**Q1 (Path around a garden, reverse problem).** A rectangular garden has a uniform path of width 3 m around it. If the outer boundary measures 26 m  $\times$  20 m, find the area of the path.

**Solution:** Inner garden =  $(26 - 2 \times 3) \times (20 - 2 \times 3) = 20 \times 14 = 280 \text{ m}^2$ . Outer area =  $26 \times 20 = 520 \text{ m}^2$ . **Area of path =  $520 - 280 = 240 \text{ m}^2$ .**

**Q2 (Triangle area from three points, using base-height).** A triangle has a base of 9 cm and its area is  $54 \text{ cm}^2$ . Find its height.

**Solution:** Area =  $\frac{1}{2} \times \text{base} \times \text{height} \Rightarrow 54 = \frac{1}{2}(9)(h) \Rightarrow h = 108/9 = \mathbf{12 \text{ cm}}$ .

**Q3 (Assertion–Reason).** Assertion (A): Doubling only the base of a parallelogram (keeping height fixed) doubles its area. Reason (R): Area of a parallelogram = base  $\times$  height.

**Solution:** R is **true** and correctly explains A: since Area = base  $\times$  height, doubling the base while height stays fixed exactly doubles the product, hence doubles the area. **Both A and R are true, and R correctly explains A.**

**Q4 (Trapezium, missing height).** A trapezium has parallel sides 15 cm and 9 cm, and its area is  $96 \text{ cm}^2$ . Find its height.

**Solution:**  $96 = \frac{1}{2}(15+9)(h) = 12h \Rightarrow \mathbf{h = 8 \text{ cm}}$ .

**Q5 (Rhombus, missing diagonal).** A rhombus has area  $210 \text{ cm}^2$  and one diagonal 21 cm. Find the other diagonal.

**Solution:**  $210 = \frac{1}{2}(21)(d_2) \Rightarrow d_2 = 420/21 = \mathbf{20 \text{ cm}}$ .

**Q6 (Composite figure).** A plot is an L-shape formed by a 12 m  $\times$  8 m rectangle with a 4 m  $\times$  3 m rectangular notch cut from one corner. Find the remaining area.

**Solution:** Full rectangle =  $12 \times 8 = 96 \text{ m}^2$ . Notch removed =  $4 \times 3 = 12 \text{ m}^2$ . **Remaining area =  $96 - 12 = 84 \text{ m}^2$ .**

**Q7 (Scaling reasoning).** If a triangle's base and height are both tripled, by what factor does its area increase?

**Solution:** Area =  $\frac{1}{2} \times \text{base} \times \text{height}$ . Tripling both:  $\frac{1}{2} \times (3b) \times (3h) = 9 \times (\frac{1}{2}bh)$ . **The area increases by a factor of 9** (since both dimensions scale by 3, area scales by  $3^2=9$ ).

**Q8 (Unit conversion, HOTS).** A rectangular plot measures 15 ft by 20 ft. Find its area in both  $\text{ft}^2$  and  $\text{m}^2$  (use 1 ft = 0.3048 m).

**Solution:** Area =  $15 \times 20 = \mathbf{300 \text{ ft}^2}$ . In metres: 15 ft = 4.572 m, 20 ft = 6.096 m  $\Rightarrow$  Area =  $4.572 \times 6.096 \approx \mathbf{27.87 \text{ m}^2}$ .

**Q9 (Spot the error).** A student says: "Since a rhombus and a rectangle can have the same diagonals, they must have the same area." Is this correct?

**Solution: Incorrect.** A rhombus's area depends on  $\frac{1}{2} \times d_1 \times d_2$  only because its diagonals are perpendicular bisectors of each other — that specific formula doesn't apply to a general rectangle (whose area is length  $\times$  width, not related to its diagonals the same way). Two shapes sharing the same diagonal lengths do not, in general, have the same area unless the diagonals play the same geometric role in both.

**Q10 (Multi-step composite area).** A trapezium-shaped field has parallel sides 40 m and 24 m with height 18 m. A circular pond of radius 7 m (use  $\pi=22/7$ ) sits inside it. Find the usable (non-pond) area of the field.

**Solution:** Trapezium area =  $\frac{1}{2}(40+24)(18) = \frac{1}{2}(64)(18) = 576 \text{ m}^2$ . Pond area =  $\pi r^2 = (22/7)(7^2) = 22 \times 7 = 154 \text{ m}^2$ . **Usable area =  $576 - 154 = 422 \text{ m}^2$ .**

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