Triangle area

6 questions | 15 marks

Equivalent correct methods earn the corresponding marks.

1. A triangle has base 12 cm and perpendicular height 7 cm. Find its area. [2 marks]

$K = \frac{1}{2} \times 12 \times 7 = 42\,\text{cm}^2$.

Answer: $42\,\text{cm}^2$

2. Find the area using sides 10 m and 13 m enclosing 40°. Round to one decimal place. [2 marks]

$K = \frac{1}{2} \times 10 \times 13 \times \sin 40^\circ$.

$K \approx 41.8\,\text{m}^2$.

Answer: $41.8\,\text{m}^2$

3. Sides 6 cm and 8 cm enclose an acute angle. Their triangle has area $12\,\text{cm}^2$. Find the angle. [2 marks]

$\sin C = \frac{2 \times 12}{6 \times 8} = 0.5$.

$C = 30^\circ$ because it is acute.

Answer: 30°

4. A 10 m diagonal splits a quadrilateral into triangles. Their perpendicular heights to that diagonal, on opposite sides, are 4 m and 7 m. Find the total area. [3 marks]

$K = \frac{1}{2} \times 10 \times 4 + \frac{1}{2} \times 10 \times 7.$

$K = 20 + 35 = 55\,\text{m}^2.$

Answer: $55\,\text{m}^2$

5. Two sides are fixed at 8 cm and 11 cm. Find the greatest possible triangle area and state when it occurs. [3 marks]

$K = 44\sin C \leq 44.$

The maximum sine value 1 occurs at 90°.

Answer: $44\,\text{cm}^2$, at included angle 90°.

6. Triangle ABC has $a = 6$, $b = 9$ and $A = 35^\circ$. Explain why $\frac{1}{2} \times 6 \times 9 \times \sin 35^\circ$ is not justified. [3 marks]

Sides a and b meet at C, whereas A is opposite a.

Find a matching included angle before using the formula.

Answer: A is not the included angle between sides a and b.