Similarity and fixed trigonometric ratios

6 questions | 14 marks

Equivalent correct methods earn the corresponding marks.

1. Compare $\frac{\text{opposite}}{\text{adjacent}}$ for side pairs $(3, 4)$ and $(9, 12)$. [2 marks]

$\frac{9}{12} = \frac{3}{4}$.

Matching angles agree.

Answer: Both are $\frac{3}{4} = 0.75$

2. Show that $\frac{\text{opposite}}{\text{hypotenuse}}$ ratios $\frac{5}{13}$ and $\frac{15}{39}$ agree. [2 marks]

$\frac{15}{39} = \frac{15 \div 3}{39 \div 3} = \frac{5}{13}$.

Answer: Both are $\frac{5}{13}$

3. $\frac{\text{Adjacent}}{\text{hypotenuse}} = \frac{4}{5}$. Find adjacent when hypotenuse $= 30$ cm. [2 marks]

$a = 30(\frac{4}{5}) = 24$ cm.

Answer: 24 cm

4. $\frac{\text{Opposite}}{\text{adjacent}} = \frac{3}{4}$. Find opposite when adjacent $= 20$ m. [2 marks]

$\frac{o}{20} = \frac{3}{4}$.

$o = 15$ m.

Answer: 15 m

5. Corresponding legs are 3,4 in one triangle and 6,4 in another. Are they similar? [3 marks]

The scale factors are $\frac{6}{3} = 2$ and $\frac{4}{4} = 1$.

There is no single uniform scale factor.

Answer: No

6. Three $\frac{\text{opposite}}{\text{adjacent}}$ pairs are $(6, 8)$, $(12, 16)$ and $(18, 24)$. State the common ratio and explain. [3 marks]

All pairs are uniform enlargements of $(3, 4)$.

Each $\frac{\text{opposite}}{\text{adjacent}}$ ratio is $\frac{3}{4}$.

Answer: 0.75