Guide to:
Exact trig. values (harder)

maths Links

Explanation:

On non-calculator Higher papers, you must know the exact values of sin, cos, and tan for **0°, 30°, 45°, 60°, and 90°** and combine them with surd simplification, rationalising denominators, and the Sine or Cosine Rule.

Key exact values: **sin 30° = cos 60° = $\frac{1}{2}$**, **cos 30° = sin 60° = $\frac{\sqrt{3}}{2}$**, **sin 45° = cos 45° = $\frac{\sqrt{2}}{2}$**, **tan 30° = $\frac{\sqrt{3}}{3}$**, **tan 45° = 1**, **tan 60° = √3**.

Example 1: Work out the exact value of $\frac{\tan 60° + \sin 30°}{\cos 30°}$ in the form $a + \frac{\sqrt{3}}{b}$.

Solution:

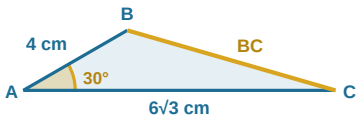
Substitute exact values: $\tan 60° = \sqrt{3}$, $\sin 30° = \frac{1}{2}$, $\cos 30° = \frac{\sqrt{3}}{2}$

Numerator: $\sqrt{3} + \frac{1}{2} = \frac{2\sqrt{3} + 1}{2}$

Divide by $\frac{\sqrt{3}}{2}$: $\frac{2\sqrt{3} + 1}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{6 + \sqrt{3}}{3}$

Answer: $2 + \frac{\sqrt{3}}{3}$

Example 2: In ΔABC, AB = 4 cm, AC = 6√3 cm, and ∠BAC = 30°. Find the exact length of BC.



Solution:

$BC^2 = 4^2 + (6\sqrt{3})^2 - 2(4)(6\sqrt{3}) \cos 30°$

$BC^2 = 16 + 108 - 48\sqrt{3}(\frac{\sqrt{3}}{2}) = 124 - 72 = \mathbf{52}$

$BC = \sqrt{52} = 2\sqrt{13}$ cm

Answer: 2√13 cm

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Corbettmaths (Textbook)	Qs	Ans	**E Classroom**	Qs	Ans
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ken@mathslinks.co.uk