

$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$\cos A = \frac{a^2 - b^2 - c^2}{-2bc}$$

$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

Prove the following identities:

" Use the Sine Rule or Cosine Rule to prove the following identities: "

21.  $c = b \cos A + a \cos B$

$$\text{RHS} = \cancel{b} \left( \frac{b^2 + c^2 - a^2}{2\cancel{bc}} \right) + \cancel{a} \left( \frac{a^2 + c^2 - b^2}{2\cancel{ac}} \right)$$

$$= \frac{\cancel{b}^2 + c^2 - \cancel{a}^2 + \cancel{a}^2 + c^2 - \cancel{b}^2}{2c}$$

$$= \frac{2c^2}{2c}$$

$$= c$$

$$\Delta = \frac{1}{2} ab \sin C$$

Sine Rule

$$\frac{\sin A}{a} = \frac{\sin B}{b}$$

Show area of  $\Delta$  is

$$\Rightarrow \frac{a^2 \cancel{\sin B} \cancel{\sin C}}{2 \cancel{\sin A}} = \frac{1}{2} \cancel{a} \cancel{b} \cancel{\sin C}$$

$$\Rightarrow \frac{a \sin B}{\sin A} = b$$

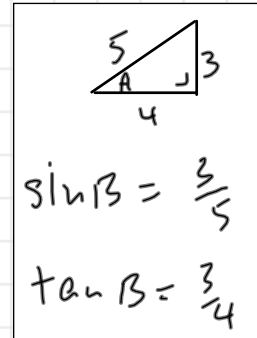
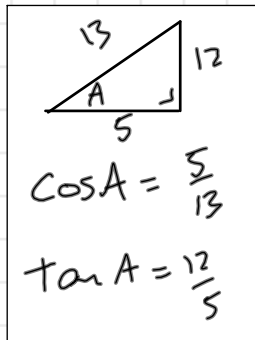
$$(\div \sin B) \Rightarrow \frac{a}{\sin A} = \frac{b}{\sin B} \quad \checkmark$$

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Q.1 P. 399

$$\sin A = \frac{12}{13}$$

$$\cos B = \frac{4}{5}$$



$$\begin{aligned}
 (v) \sin(A+B) &= \sin A \cos B + \cos A \sin B \\
 &= \left(\frac{12}{13}\right)\left(\frac{4}{5}\right) + \left(\frac{5}{13}\right)\left(\frac{3}{5}\right) \\
 &= \frac{63}{65}
 \end{aligned}$$

P.399 Q19

If  $\cos 2A = \frac{1}{49}$  find two values of  $\cos A$  without evaluating  $A$ .

$$\cos 2A = \frac{1 - \tan^2 A}{1 + \tan^2 A}$$

$$\frac{1}{49} = \frac{1 - \tan^2 A}{1 + \tan^2 A}$$

let  $t = \tan A$   
 (note: you don't have to do this)

$$\frac{1}{49} = \frac{1 - t^2}{1 + t^2}$$

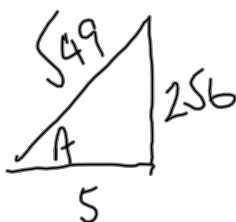
$$1 + t^2 = 49 - 49t^2$$

$$50t^2 - 48 = 0$$

$$t^2 = \frac{48}{50} = \frac{24}{25}$$

$$t = \tan A = \pm \sqrt{\frac{24}{25}} = \pm \frac{2\sqrt{6}}{5}$$

$$\Rightarrow \cos A = \pm \frac{5}{\sqrt{49}}$$



Alternative method

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Q. 19

$$\cos 2A = \cos^2 A - \sin^2 A$$

$$\sin^2 A = \frac{1}{2}(1 - \cos 2A)$$

$$\cos 2A = \frac{1}{49} \quad \text{find two}$$

values of  $\cos A$  without evaluating  $A$ .

$$\cos 2A = \cos^2 A - \frac{1}{2}(1 - \cos 2A)$$

$$\frac{1}{49} = \cos^2 A - \frac{1}{2}\left(1 - \frac{1}{49}\right)$$

$$\frac{1}{49} = \cos^2 A - \frac{24}{49}$$

$$\cos^2 A = \frac{25}{49}$$

$$\cos A = \pm \sqrt{\frac{25}{49}} = \pm \frac{5}{\sqrt{49}}$$