south

$$\vec{S} = -400\hat{j} + 400\hat{j} \Rightarrow \underline{\vec{S} = 0}$$

8th class WS-1 foundation + Task

① Given $\sin 30 \times \cos 60 = ?$

$$\Rightarrow \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$$

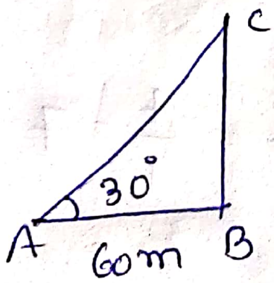
② Given $\frac{\tan 60^\circ}{\cot 60^\circ} = ?$

$$\Rightarrow \frac{\sqrt{3}}{\frac{1}{\sqrt{3}}} = \sqrt{3} \times \sqrt{3} = 3$$

③ Given $\tan 60 - \cot 60^\circ = ?$

$$\Rightarrow \sqrt{3} - \frac{1}{\sqrt{3}} \Rightarrow \frac{3-1}{\sqrt{3}} = \frac{2}{\sqrt{3}}$$

④ According to Given data



Then $\tan 30^\circ = \frac{BC}{AB}$

$$\Rightarrow \frac{1}{\sqrt{3}} = \frac{BC}{60} \Rightarrow BC = \frac{60}{\sqrt{3}}$$

$$\Rightarrow BC = \frac{\cancel{3}^{\sqrt{3}} \times \cancel{60}^{20}}{\cancel{\sqrt{3}}} = 20\sqrt{3}\ m$$

(5) Given $\cos 0^\circ + \sin 90^\circ + \sqrt{2} \sin 45^\circ = ?$

$\Rightarrow 1 + 1 + \cancel{\sqrt{2}} \times \frac{1}{\cancel{\sqrt{2}}}$

$\Rightarrow 1 + 1 + 1$

$= 3$

(6) Given $\tan 30^\circ \cot 30^\circ + \tan 60^\circ . \sec 30^\circ = ?$

$\Rightarrow \frac{1}{\cancel{\sqrt{3}}} \times \cancel{\sqrt{3}} + \cancel{\sqrt{3}} \times \frac{2}{\cancel{\sqrt{3}}}$

$\Rightarrow 1 + 2$

$\Rightarrow 3.$

(7) They are asking $\frac{\sin 45^\circ \times \cos 45^\circ + \tan 30^\circ \times \sec 30^\circ}{\sin 60^\circ - \cos 60^\circ} = ?$

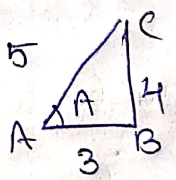
$\Rightarrow \frac{\frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{3}} \frac{2}{\sqrt{3}}}{\frac{\sqrt{3}}{2} - \frac{1}{2}} = \frac{\frac{1}{2} + \frac{2}{3}}{\frac{\sqrt{3}-1}{2}} = \frac{\frac{7}{\cancel{2} \times 3}}{\frac{\sqrt{3}-1}{\cancel{2}}}$

$\Rightarrow \frac{7}{3(\sqrt{3}-1)}$

(8) Given $4 \cot A = 3$

From Δ^{le}

$\Rightarrow \cot A = \frac{3}{4}$



$AC = \sqrt{AB^2 + BC^2}$

$= \sqrt{3^2 + 4^2}$

$AC = \sqrt{9 + 16}$

$= \sqrt{25} = 5m$

$\therefore \sin A = \frac{4}{5}$; $\cos A = \frac{3}{5}$

$\therefore \frac{\sin A + \cos A}{\sin A - \cos A} = \frac{\frac{4}{5} + \frac{3}{5}}{\frac{4}{5} - \frac{3}{5}}$

$\Rightarrow \frac{\frac{4+3}{\cancel{5}}}{\frac{4-3}{\cancel{5}}} = \frac{7}{1} = 7$

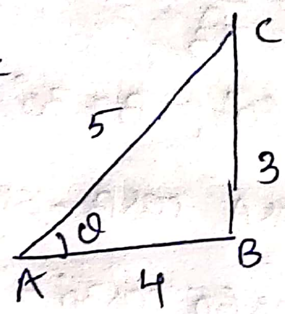
BC AB

$\Rightarrow \cancel{3/4} + \frac{5}{3}$

$\Rightarrow \cancel{BC = 16}$

$\Rightarrow BC = 4$

(9) Given $\sin\theta = \frac{6}{10} = \frac{3}{5}$



$AC^2 = AB^2 + BC^2$

$\Rightarrow 5^2 = AB^2 + 3^2$

$\Rightarrow 25 = AB^2 + 9$

$\Rightarrow AB^2 = 16$

$\Rightarrow AB = 4$

$\tan\theta = \frac{BC}{AB} = \frac{3}{4}$

$\sec\theta = \frac{AC}{AB} = \frac{5}{4}$

$\therefore$ The value of $\tan\theta + \sec\theta$

$\Rightarrow \frac{3}{4} + \frac{5}{4}$

$\Rightarrow \frac{8}{4} = 2$

(10) Given $\cos^2 75 + \sin^2 75 + \operatorname{cosec}^2 80^\circ - \cot^2 80 = ?$

we know that $\cos^2\theta + \sin^2\theta = 1$ & $\operatorname{cosec}^2\theta - \cot^2\theta = 1$

$\therefore \cos^2 75 + \sin^2 75 + \operatorname{cosec}^2 80^\circ - \cot^2 80$

$\Rightarrow 1 + 1$

$\Rightarrow 2$

(12) (I) we know that $\sec^2\theta - \tan^2\theta = 1$

so $\sec^2 45^\circ - \tan^2 45^\circ = 1$

(II) $3\tan^2 30^\circ + 4\cos^2 45^\circ$

$\Rightarrow 3\left[\frac{1}{\sqrt{3}}\right]^2 + 4\left[\frac{1}{2}\right]^2$

$\Rightarrow \cancel{3}\left[\frac{1}{\cancel{3}}\right] + \cancel{4}\left[\frac{1}{\cancel{4}}\right] = 1 + 1 = 2$

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(13) Given $\frac{\tan 60^\circ - \tan 30^\circ}{1+\tan 60^\circ \tan 30^\circ} = ?$

$$\Rightarrow \frac{\sqrt{3} - \frac{1}{\sqrt{3}}}{1+\cancel{\sqrt{3}}\times\frac{1}{\cancel{\sqrt{3}}}} = \frac{\frac{3-1}{\sqrt{3}}}{1+1} = \frac{\frac{\cancel{2}}{\sqrt{3}}}{\cancel{2}}$$

$$= \frac{1}{\sqrt{3}}$$

(14) If $A = 60^\circ$; $B = 30^\circ$

Then $\cos A \cos B - \sin A \sin B$

$$\Rightarrow \cos 60^\circ \cos 30^\circ - \sin 60^\circ \sin 30^\circ$$

$$\Rightarrow \frac{\sqrt{3}}{2}\ \frac{1}{2} - \frac{\sqrt{3}}{2}\ \frac{1}{2}$$

$$\Rightarrow \frac{\sqrt{3}}{4} - \frac{\sqrt{3}}{4} = 0$$

(15) Given $1 - 2\sin^2 30^\circ = ?$

(i.e) $\Rightarrow 1 - 2\left[\frac{1}{2}\right]^2$

$$\Rightarrow 1 - \cancel{2}\times\frac{1}{\cancel{4}\,2} = 1 - \frac{1}{2} = \frac{1}{2}$$

(16) Given $\cos 0^\circ \times \cos 1^\circ \times \cos 2^\circ \times \cos 3^\circ \times \cdots \times \cos 100^\circ = ?$

In this product $\cos 90^\circ$ is also there.

$\therefore \cos 90^\circ = 0$

$\therefore$ The value of given product $= 0$

(17) Given the value of $2\sin^2 30^\circ - 3\cos^2 45^\circ + \tan^2 60^\circ = ?$

$$\Rightarrow 2\left(\frac{1}{2}\right)^2 - 3\left[\frac{1}{\sqrt{2}}\right]^2 + \left[\sqrt{3}\right]^2$$

$$\Rightarrow \cancel{2}\times\frac{1}{\cancel{4}\,2} - 3\times\frac{1}{2} + 3$$

$$\Rightarrow \frac{1}{2} - \frac{3}{2} + 3 = \frac{1-3}{2} + 3 = -\frac{2}{2} + 3$$

$$= -1 + 3 = 2$$

(19). Given $\cos\theta = \frac{\sqrt{3}}{2}$ ie) $\theta = 30^\circ$

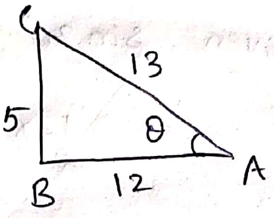
$\therefore \sin^2\theta + \tan^2\theta = \sin^2 30 + \tan^2 30$

$= \left(\frac{1}{2}\right)^2 + \left(\frac{1}{\sqrt{3}}\right)^2$

$= \frac{1}{4} + \frac{1}{3} = \frac{3+4}{12} = \frac{7}{12}$

(20) $\cos\theta = \frac{12}{13}$

From right angle triangle



From Pythagoras theorem

$hyp^2 = Side_1^2 + Side_2^2$

$\Rightarrow AC^2 = AB^2 + BC^2$

$\Rightarrow 13^2 = 12^2 + BC^2$

$\Rightarrow 169 = 144 + BC^2$

$\Rightarrow BC^2 = 169 - 144 = 25$

$\Rightarrow BC = \sqrt{25} = 5$

$\therefore \tan\theta = \frac{BC}{AB} = \frac{5}{12}$

$\cot\theta = \frac{1}{\tan\theta} = \frac{12}{5}$

$\sin\theta = \frac{BC}{AC} = \frac{5}{13}$

$\sec\theta = \frac{AC}{AB} = \frac{13}{12}$

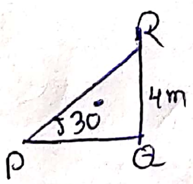
L Task

CUQ's

(4) Given $\cos\theta = \frac{1}{2} \Rightarrow \theta = 60^\circ$

$\therefore \tan\theta = \tan 60^\circ = \frac{1}{\sqrt{3}}$

(5) From the given triangle



$QR = 4m$

From Py $\sin\theta = \frac{QR}{PR}$ $\Rightarrow PR = 8m$

$\Rightarrow \sin 30 = \frac{4}{PR}$

$\Rightarrow \frac{1}{2} = \frac{4}{PR} \Rightarrow PR = 8m$

SAQ's

(3) $\sin^2 30 + \cos^2 30$

$\Rightarrow \left[\frac{1}{2}\right]^2 + \left[\frac{\sqrt{3}}{2}\right]^2$

$\Rightarrow \frac{1}{4} + \frac{3}{4} = \frac{1+3}{4} = \frac{4}{4} = 1$

(4) Given $\sin 30^\circ \times \cos 30^\circ + \sin 45^\circ \times \cos 45^\circ$

$\Rightarrow \frac{1}{2} \times \frac{\sqrt{3}}{2} + \frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}}$

$\Rightarrow \frac{\sqrt{3}}{4} + \frac{1}{2} = \frac{\sqrt{3}+2}{4}$

(5) Given $\sin 0^\circ + \cos 0^\circ$

$\Rightarrow 0 + 1$

$\Rightarrow 1$

(6) $\operatorname{cosec} 45^\circ - \sec 45^\circ$

$\Rightarrow \sqrt{2} - \sqrt{2}$

$\Rightarrow 0$

(7) Given $\sin 30 + \cos 60^\circ = ?$

$\Rightarrow \frac{1}{2} + \frac{1}{2}$

$\Rightarrow \frac{1+1}{2}$

$\Rightarrow 1$

(8) Given $\sin\theta = \frac{1}{2} \Rightarrow \theta = 30^\circ$

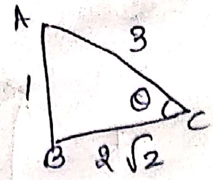
$\therefore$ ~~cosec 30° = 1/sin 30~~

$\operatorname{cosec} 30^\circ = \frac{1}{\sin 30}$

$\Rightarrow \operatorname{cosec} 30^\circ = \frac{1}{\frac{1}{2}}$

$\Rightarrow \operatorname{cosec} 30^\circ = 2$

(9). $\sin\theta = \frac{1}{3}$



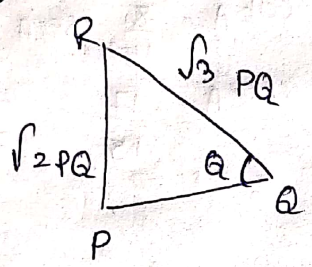
$\tan\theta = \frac{AB}{BC}$; $\tan\theta = \frac{1}{2\sqrt{2}}$

(11) $\sec\theta = \frac{2}{\sqrt{3}}$ ie $\theta = 30°$

$\therefore \sin 30 = \frac{1}{2}$; $\tan 30 = \frac{1}{\sqrt{3}}$; $\cos 30 = \frac{\sqrt{3}}{2}$

$\cot 30 = \sqrt{3}$

(12)



also Given $QR = \sqrt{3}\,PQ$.

By Pythagorous theorem

$QR^2 = PQ^2 + PR^2$

$\Rightarrow (\sqrt{3}\,PQ)^2 = PQ^2 + PR^2$

$\Rightarrow 3PQ^2 = PQ^2 + PR^2 \Rightarrow PR^2 = 3PQ^2 - PQ^2$

$\Rightarrow PR^2 = 2PQ^2$

$\Rightarrow PR = \sqrt{2}\,PQ$

$\sin Q = \frac{PR}{QR}$

$\Rightarrow \sin Q = \frac{\sqrt{2}\,PQ}{\sqrt{3}\,PQ}$

$\Rightarrow \sin Q = \sqrt{\frac{2}{3}}$

$\cos Q = \frac{PQ}{QR} = \frac{PQ}{\sqrt{3}\,PQ}$

$\Rightarrow \cos Q = \frac{1}{\sqrt{3}}$

$\cot R = \frac{PR}{PQ}$

$\cot R = \frac{\sqrt{2}\,PQ}{PQ}$

$\cot R = \sqrt{2}$

(21) Given the value of $2(\sin 45° \times \cos 45°)$

$= 2 \times \frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}}$

$= \cancel{2} \times \frac{1}{\cancel{2}}$

$= 1$

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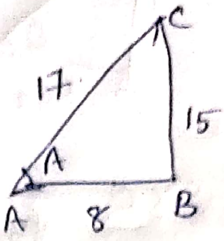
(18) Given $15\cos A - 8\sin A = 0$

$\Rightarrow 15\cos A = 8\sin A$

$\Rightarrow \frac{15}{8} = \frac{\sin A}{\cos A}$

$\Rightarrow \tan A = \frac{15}{8}$



Acc to Pythagorous theorem

$AC^2 = AB^2 + BC^2$

$\Rightarrow AC^2 = 8^2 + 15^2$ $\Rightarrow AC = 17$

$= 64 + 225$

$= 289$

$\sin A = \frac{15}{17}$; $\cos A = \frac{8}{17}$

$\cot A = \frac{8}{15}$; $\sec A = \frac{17}{8}$

$\csc A = \frac{17}{15}$

$\therefore$

Given $\frac{\sin A + \cos A}{2\cos A - \sin A} = ?$

$$\Rightarrow \frac{\frac{15}{17} + \frac{8}{17}}{2\times\frac{8}{17} - \frac{15}{17}} = \frac{\frac{15+8}{\cancel{17}}}{\frac{16-15}{\cancel{17}}} = \frac{23}{1} = 23$$

(19)

$$\frac{15\cot A + 17\sin A}{8\tan A + 16\sec A} = \frac{\cancel{15}\times\frac{8}{\cancel{15}} + \cancel{17}\times\frac{15}{\cancel{17}}}{\cancel{8}\times\frac{15}{\cancel{8}} + \cancel{16}^{2}\times\frac{17}{\cancel{8}}}$$

$$= \frac{8+15}{15+34} = \frac{23}{49}$$

(20)

$$\frac{\sec A - \csc A}{\csc A + \sec A} = \frac{\frac{17}{8} - \frac{17}{15}}{\frac{17}{15} + \frac{17}{8}} = \frac{\cancel{17}\left[\frac{15-8}{\cancel{15\times 8}}\right]}{\cancel{17}\left[\frac{8+15}{\cancel{15\times 8}}\right]}$$

$$= \frac{7}{23}$$

(23) Given $\sin^2 60 + \cos^2 60' = ?$

$$\Rightarrow \left[\frac{\sqrt{3}}{2}\right]^2 + \left[\frac{1}{2}\right]^2$$

$$\Rightarrow \frac{3}{4} + \frac{1}{4} = \frac{4}{4} = 1$$

(21) Given

$2(\sin 45^\circ \times \cos 45^\circ)$

$$= 2 \times \left(\frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}}\right)$$

$$= 2 \times \frac{1}{2}$$

$$= 1.$$

(25)

(a) For $A = 30$; $B = 45^\circ$

From (3) $\csc^2 A + \cot^2 B = \csc^2 30 + \cot^2 45^\circ$

$$= [2]^2 + [1]^2$$

$$= 4 + 1 = 5$$

(b) For $A = 60^\circ$; $B = 60^\circ$

From (2) $\dfrac{1 - \sin A}{\cos B} = \dfrac{1 - \sin 60}{\cos 60} = \dfrac{1 - \frac{\sqrt{3}}{2}}{\frac{1}{2}}$

$$= \frac{\frac{2-\sqrt{3}}{\cancel{2}}}{\frac{1}{\cancel{2}}} = 2 - \sqrt{3}$$

(c) For $A = 60^\circ$, $B = 45^\circ$ then

From (1) $\sin^2 A - 3\cos^2 A + 2\tan B = \sin^2 60 - 3\cos^2 60 + 2\tan 45^\circ$

$$\Rightarrow \left[\frac{\sqrt{3}}{2}\right]^2 - 3\left[\frac{1}{2}\right]^2 + 2(1)$$

$$\Rightarrow \frac{3}{4} - \frac{3}{4} + 2 = 2.$$

(d) For $A = 30^\circ$; $B = 30^\circ$ then from (5)

$$\frac{1 - \tan A}{1 + \tan B} = \frac{1 - \tan 30^\circ}{1 + \tan 30^\circ} = \frac{1 - \frac{1}{\sqrt{3}}}{1 + \frac{1}{\sqrt{3}}} = \frac{\frac{\sqrt{3}-1}{\cancel{\sqrt{3}}}}{\frac{\sqrt{3}+1}{\cancel{\sqrt{3}}}}$$

$$= \frac{\sqrt{3}-1}{\sqrt{3}+1}$$