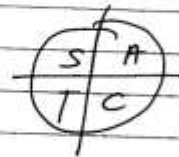


### Exercise 2.3

Q1 (i)  $\sin 50^\circ = 0.7660$  Rem  $(\cos \theta, \sin \theta)$   
(ii)  $\cos 220^\circ = -0.7660$   
(iii)  $\cos 50^\circ = 0.6428$   
(iv)  $\sin 220^\circ = -0.6428$   
(v)  $\sin (-55^\circ) = -0.8192$   
(vi)  $\cos(305^\circ) = 0.5736$

Q2 (i)  $\sin 138^\circ = 0.6691$   
(ii)  $\cos 212^\circ = -0.8480$   
(iii)  $\tan 318^\circ = -0.900$   
(iv)  $\cos 159^\circ = -0.9336$

Q3  $\cos 120^\circ = -\cos 60^\circ$



(i)  $\sin 130 = \sin 50$   
(ii)  $\cos 115 = -\cos 65$   
(iii)  $\tan 160 = -\tan 20$   
(iv)  $\cos 220 = -\cos 40$   
(v)  $\sin 250^\circ = -\sin 70$   
(vi)  $\tan 300 = -\tan 60$

Q4 (i)  $\sin 120 = \sin 60 = \frac{\sqrt{3}}{2}$   
(ii)  $\cos 135 = -\cos 45 = -\frac{1}{\sqrt{2}}$   
(iii)  $\sin 240 = -\sin 60 = -\frac{\sqrt{3}}{2}$   
(iv)  $\sin 210 = -\sin 30 = -\frac{1}{2}$   
(v)  $\cos 330 = \cos 60 = \frac{1}{2}$   
(vi)  $\tan 225 = \tan 45 = 1$   
(vii)  $\cos 150 = -\cos 30 = -\frac{\sqrt{3}}{2}$   
(viii)  $\sin 300 = -\sin 60 = -\frac{\sqrt{3}}{2}$


Q5 (i)  $\cos < 0 \Rightarrow \text{neg}$  &  $\tan > 0 \Rightarrow \text{pos}$



- (ii)  $\cos \text{ pos}$  &  $\sin \text{ pos}$  1<sup>st</sup>
- (iii)  $\tan \text{ Neg}$  &  $\sin \text{ Pos}$  2<sup>nd</sup>
- (iv)  $\tan \text{ pos}$  &  $\cos \text{ pos}$  1<sup>st</sup>

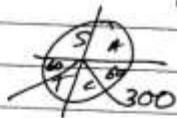
Q6

all Positive  $\Rightarrow$  all in 1<sup>st</sup> & 2<sup>nd</sup> Quadrant

(i)  $\sin 56^\circ$    $\Rightarrow$  2<sup>nd</sup> Angle =  $180 - 56 = 124^\circ$

(ii)  $\sin 112$  2<sup>nd</sup> Angle =  $180 - 112 = 68^\circ$

(iii)  $\sin 300$  is Neg  $\Rightarrow$  2<sup>nd</sup> Angle is in 3<sup>rd</sup> Quadrant



$$180 + 60 = 240^\circ$$

(iv)  $\sin 195$



$$360 - 15 = 345^\circ$$

(v)  $\sin 105$



$$180 - 105 = 75^\circ$$

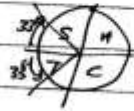
Q7

$$\begin{aligned}\sin A &= 0.2167 \\ A &= \sin^{-1} 0.2167 \\ A &= 13^\circ\end{aligned}$$



$$\begin{aligned}\text{Angle 1} &= \underline{13^\circ} \\ \text{Angle 2} &= 180 - 13 = \underline{167^\circ}\end{aligned}$$

~~Q8~~ (i)  $\cos A = -0.8428$   
 $A = 33^\circ$



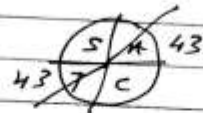
$$\begin{aligned}\text{Angle 1} &= 180^\circ - 33 = \underline{147^\circ} \\ \text{Angle 2} &= 180^\circ + 33 = \underline{213^\circ}\end{aligned}$$

(ii)  $\sin B = -0.6947$   
 $B = 44^\circ$



$$\begin{aligned}\text{Angle 1} &= 180^\circ + 44 = \underline{224^\circ} \\ \text{Angle 2} &= 360 - 44 = \underline{316^\circ}\end{aligned}$$

(ii)  $\tan C = 0.9325$   
 $C = 43^\circ$



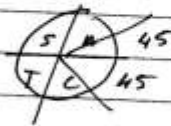
$$\begin{aligned}\text{Angle 1} &= \underline{43^\circ} \\ \text{Angle 2} &= 180 + 43 = \underline{223^\circ}\end{aligned}$$

Q9  $\sin \theta = \frac{1}{2}$   
 $\theta = 30^\circ$



Angle 1 =  $30^\circ$       Angle 2 =  $180 - 30 = 150^\circ$

Q10  $\cos \theta = \frac{1}{\sqrt{2}}$   
 $\theta = 45^\circ$



Angle 1 =  $45^\circ \Rightarrow \tan 45 = 1$

Angle 2 =  $360 - 45 = 315^\circ \Rightarrow \tan 315 = -1$

Q11  $\tan A = \frac{1}{\sqrt{3}}$   
 $A = 30^\circ$



Angle 1 =  $30^\circ \Rightarrow \cos 30^\circ = \frac{\sqrt{3}}{2}$   
 Angle 2 =  $180 + 30 = 210^\circ \Rightarrow \cos 210^\circ = -\frac{\sqrt{3}}{2}$

Q12  $\sin \theta = -\frac{\sqrt{3}}{2}$   
 $\theta = 60^\circ$



Angle 1 =  $180 + 60 = 240^\circ \Rightarrow \cos \theta = -\frac{1}{2}$   
 Angle 2 =  $360 - 60 = 300^\circ \Rightarrow \cos \theta = \frac{1}{2}$

Q13  $\sin A = -\frac{4}{5}$        $\cos A = -\frac{3}{5}$   
 $A = 53^\circ$



$\Rightarrow$  Angle =  $180 + 53 = 233^\circ$

Q14

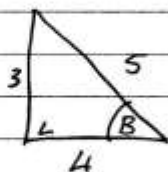
$$\sin B = \frac{3}{5} \quad \cos B = -\frac{4}{5}$$



No Calculator  $\Rightarrow$  Use a triangle to find sides + write down Tan  $\theta$ .

$$\sin B = \frac{3}{5} \frac{o}{h}$$

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



$$\Rightarrow \tan B = \frac{o}{a}$$

$$\tan B = \frac{3}{4}$$

But Tan is Neg in 2<sup>nd</sup> Quadrant

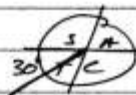
$$\Rightarrow \tan B = -\frac{3}{4}$$

Q15

$$\tan B = \frac{1}{\sqrt{3}} \frac{o}{a}$$

$$\sin B = -\frac{1}{2} \frac{o}{h}$$

$$B = 30^\circ$$



Tables  $\cos 30 = \frac{\sqrt{3}}{2}$

$$\Rightarrow \cos B = \frac{a}{h}$$

$$\cos B = \frac{\sqrt{3}}{2}$$

But cos is negative in 3<sup>rd</sup> Quadrant.

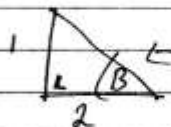
$$\Rightarrow \cos B = -\frac{\sqrt{3}}{2}$$

Q16

$$\tan B = \frac{1}{2} \frac{o}{a}$$

$$180 < A < 270$$

~~B~~ Not in Tables so use sketch  $\Rightarrow$



$$\text{Hyp}^2 = 1^2 + 2^2$$

$$H^2 = 5$$

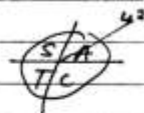
$$H = \sqrt{5}$$

$$\Rightarrow \sin A = \frac{1}{\sqrt{5}}$$

In 3<sup>rd</sup> Quadrant


$$\sin A = -\frac{1}{\sqrt{5}}$$

Q17

(i)  $\sin 420 \Rightarrow 420 - 360 = 60$  <sup>ref angle</sup> 

$\Rightarrow \sin 420 = \sin 60 = \frac{\sqrt{3}}{2}$  is Pos in 1<sup>st</sup> Qu.

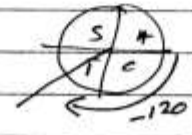
$\Rightarrow \sin 420 = \frac{\sqrt{3}}{2}$

(ii)  $\cos 495$   $495 - 360 = 135$  

$= \cos 135$   $180 - 135 = 45$

$= \cos 45 = \frac{1}{\sqrt{2}}$  is Neg in 2<sup>nd</sup> Quadrant.

$= \cos 495 = -\frac{1}{\sqrt{2}}$

(iii)  $\tan(-120)$  

$180 - 120 = 60^\circ$

$\tan 60 = \sqrt{3}$  is pos in 3<sup>rd</sup> Quadrant

$\Rightarrow \tan(-120) = \sqrt{3}$