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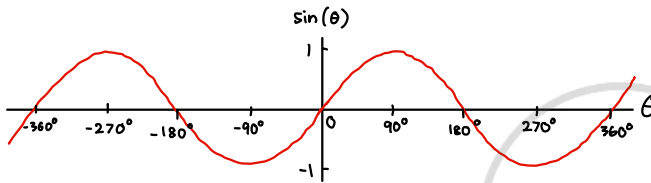
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## 9.5 Graphs of sine, cosine and tangent

1.

a)

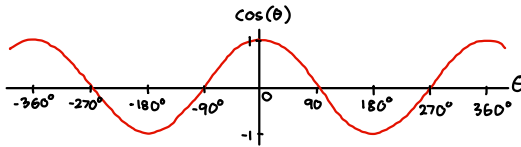


b) graph repeats after  $360^\circ$  so period of  $y = \sin \theta$  is  $360^\circ$

c) Min. value = -1  
max. value = 1

2.

a)

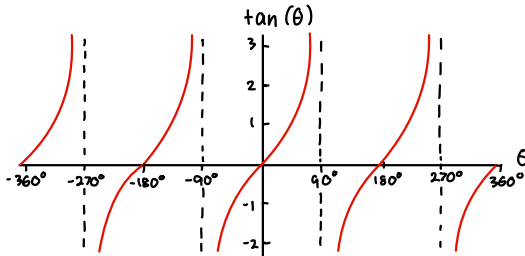


b) graph repeats after  $360^\circ$  so period of  $y = \cos \theta$  is  $360^\circ$

c) min. value = -1  
max. value = 1

3.

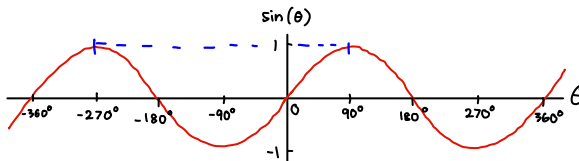
a)



b) graph repeats after  $180^\circ$  so period of  $y = \tan \theta$  is  $180^\circ$

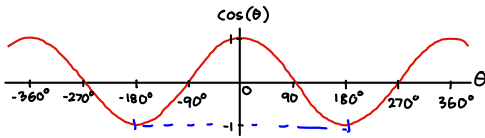
4.

a)  $\sin \theta = 1$



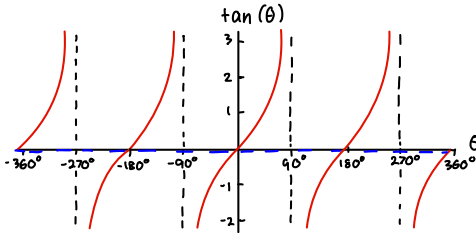
$\sin \theta = 1$  at  $-270^\circ$  and  $90^\circ$

4. b)  $\cos\theta = -1$



$\cos\theta = -1$  at  $-180^\circ$  and  $180^\circ$

c)  $\tan\theta = 0$

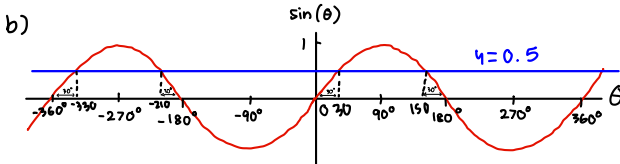


$\tan\theta = 0$  at  $-360^\circ$ ,  $-180^\circ$ ,  $0^\circ$ ,  $180^\circ$ , and  $360^\circ$

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5.

a)  $\sin\theta = 0.5$   
 $\sin^{-1} 0.5 = 30$   
 $\therefore \sin 30 = 0.5$



c)  $\sin 30 = 0.5$

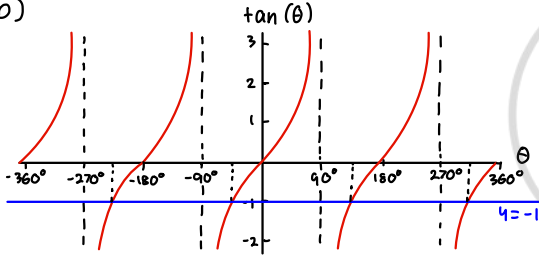
Points of intersections

$\hookrightarrow -330^\circ, -210^\circ, 30^\circ, 150^\circ$

6.

$$\begin{aligned} \text{a) } \tan \theta &= -1 \\ \tan^{-1} -1 &= -45 \\ \therefore \tan -45 &= -1 \end{aligned}$$

b)



$$\text{c) } \tan -45 = -1$$

Points of intersections:

$$360 - 45 = 315$$

$$180 - 45 = 135$$

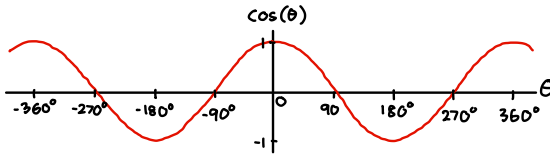
$$0 - 45 = -45$$

$$-180 - 45 = -225$$

 $\therefore$  Solutions are  $-225^\circ$ ,  $-45^\circ$ ,  $135^\circ$ , and  $315^\circ$ 

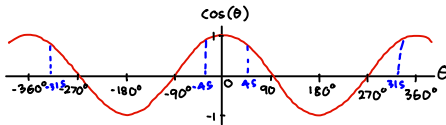
7.

a)



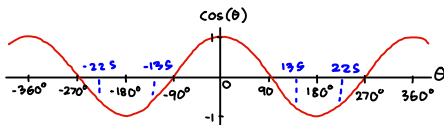
$$\text{b) } \cos 45 = \frac{1}{\sqrt{2}}$$

$$\text{i) } \cos \theta = \frac{1}{\sqrt{2}}$$



$$\theta = \pm 45^\circ \text{ and } \pm 315^\circ$$

$$\text{ii) } \cos \theta = -\frac{1}{\sqrt{2}}$$



$$\theta = \pm 135^\circ \text{ and } \pm 225^\circ$$

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