

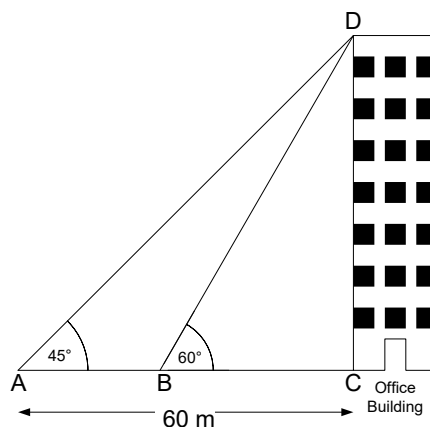
GEOMETRY AND TRIGONOMETRIC CALCULATIONS



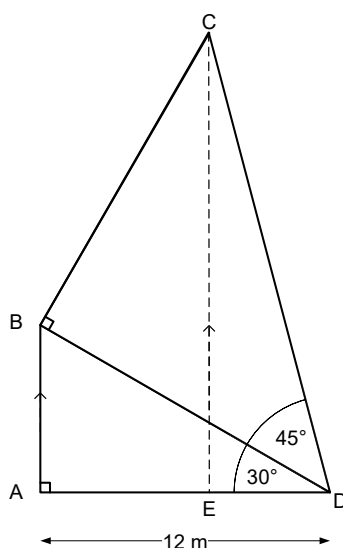
WWW.ACHILDGUIDETO.COM

Trigonometry Problems

- 1 Bill and Ben used a clinometer to measure the angle from where they were standing to the top of a tall building. The measured the distance from where they were standing to the foot of the building. The results are shown in the diagram below.



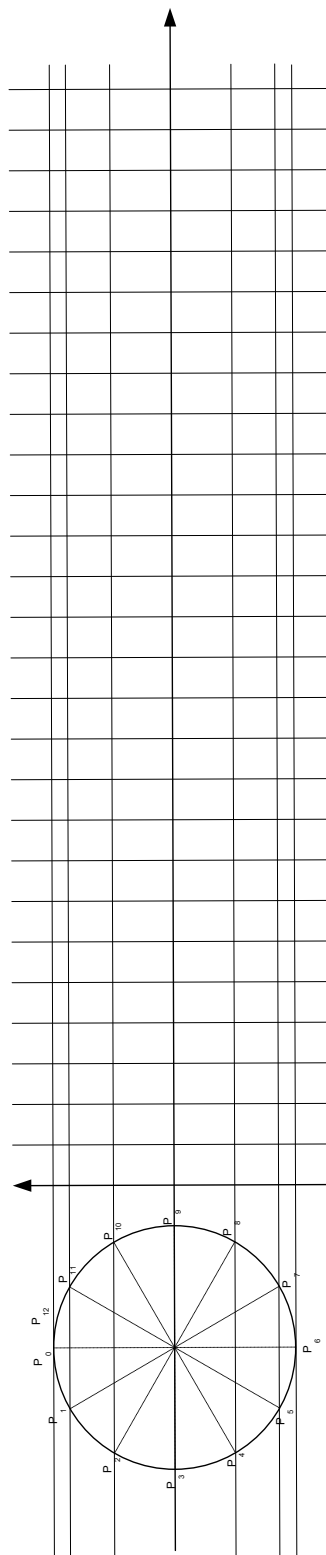
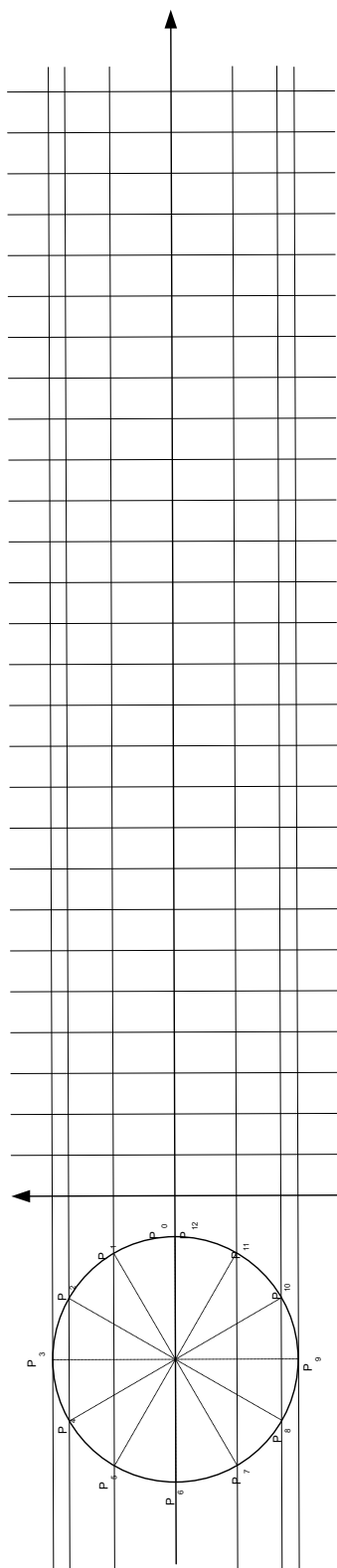
- i What is the height of the building?
 - ii What is the distance from A to B?
- 2 A ski lift is installed in the Alps to allow skiers to rise from an elevation of 2,858 m to 3103 m. The wire running along which the skiers will be carried is 450m long. What is the angle of elevation of the skiers on the lift?
- 3 AED is a straight line. AEC is a right angle. AB and CE are parallel. How long is CE?



Sine and Cosine Graphs

1 Complete the Sine Graph below.

2 Complete the Cosine Graph below.



3 Fill in the blanks in the text below.

Sine graphs are _____ which means that they have a pattern that repeats over and again. One cycle takes 360° (as in the circle) or 2π radians. Then the pattern _____ .

P_0 on a sine wave starts on the x axis which is on the _____ of the circle. There are _____ plotted in one cycle of the graph so each one is _____ $^\circ$.

Cosine graphs are _____ which means that they have a pattern that repeats over and again. One cycle takes 360° (as in the circle) or 2π radians. Then the pattern _____ .

P_0 on a cosine wave starts at the top of the circle. There are _____ points plotted in one cycle of the graph so each one is _____ $^\circ$.

If we were to plot a cosine wave and a sine wave on the same axis, the cosine wave would _____ the sine wave by 90° or $\frac{\pi}{2}$ radians.

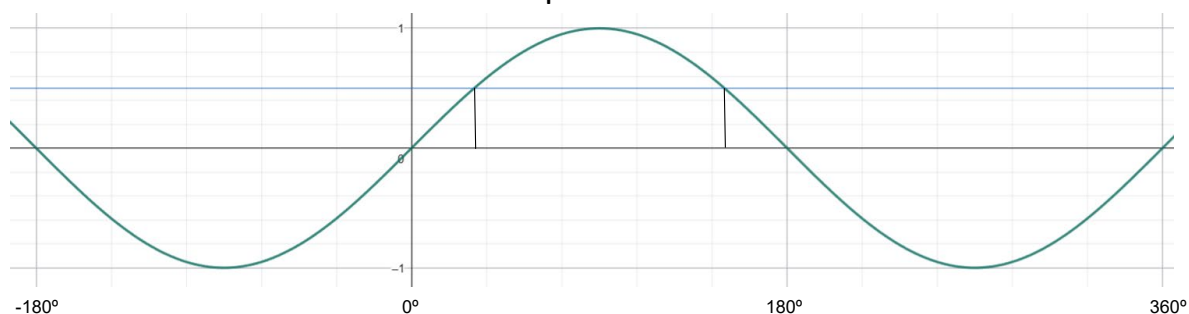
Periodic functions are said to _____ through their position at rest.

WORDS TO HELP YOU:

REPEATS	OSCILLATE	LEAD
PERIODIC	TWELVE	THIRTY
SIXTY	NINETY	RADIANS

- 4 Go on www.geogebra.org and type in $f(x)=\tan(x)$.
- What is the period of the graph?
 - If you drew the line $x=90$ and $x=270$, what would the name of these lines be?
 - Sketch the graph in your book noting the position of asymptotes.

- 5 Solve $\sin \theta = 0.5$ for all values $-180 \leq \theta \leq 360$
 The calculator always gives the principal value which is in the range $-90 \leq \theta \leq 90$. This is not the complete solution.



NB To find the second angle, find the principal angle and then perform the following calculations depending on the trigonometric function:

$$\sin^{-1} \theta \qquad \sin^{-1}(180 - \theta)$$

$$\cos^{-1} \theta \qquad \cos^{-1}(360 - \theta)$$

$$\tan^{-1} \theta \qquad \tan^{-1}(\theta + 180)$$

To find further angles, add 360 to the angles you have had to find already.

- 6 Find all the angles for the following between $-180 \leq \theta \leq 540$.
- $\tan \theta = 0.7$
 - $\cos \theta = -0.2$
 - $\sin \theta = 0.42$
 - $\cos \theta = 0.14$
 - $\tan \theta = -1.4$