

Graphing Trigonometric Functions

Find the amplitude, if it exists, and period of each function. Then graph each function.

1. $y = -4 \sin \theta$

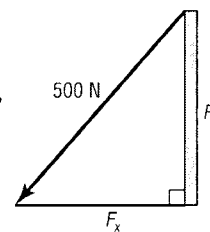
3. $y = \cos 5\theta$

All work on looseleaf, or better yet, do the graphs on graph paper! Yes, I know 2, 4, 5 are missing -- I deleted them!

6. $2y = \sin \theta$

FORCE For Exercises 7 and 8, use the following information.

An anchoring cable exerts a force of 500 Newtons on a pole. The force has the horizontal and vertical components F_x and F_y . (A force of one Newton (N), is the force that gives an acceleration of 1 m/sec^2 to a mass of 1 kg.)



7. The function $F_x = 500 \cos \theta$ describes the relationship between the angle θ and the horizontal force. What are the amplitude and period of this function?

8. The function $F_y = 500 \sin \theta$ describes the relationship between the angle θ and the vertical force. What are the amplitude and period of this function?

WEATHER For Exercises 9 and 10, use the following information.

The function $y = 60 + 25 \sin \frac{\pi}{6}t$, where t is in months and $t = 0$ corresponds to April 15, models the average high temperature in degrees Fahrenheit in Centerville.

9. Determine the period of this function. What does this period represent?

10. What is the maximum high temperature and when does this occur?

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Verify that each of the following is an identity.

1. $\csc \theta \cdot \sec \theta = \cot \theta + \tan \theta$

2. $\frac{\tan^2 \theta}{1 - \cos^2 \theta} = \frac{\sec \theta}{\cos \theta}$

3. $\frac{\cos \theta \cdot \cot \theta}{\sin \theta} = \frac{\csc \theta}{\sin \theta \cdot \sec^2 \theta}$

4. $\frac{\csc^2 \theta - \cot^2 \theta}{\sec^2 \theta} = \cot^2 \theta (1 - \cos^2 \theta)$

Example

State the vertical shift, equation of the midline, amplitude, and period for $y = \cos 2\theta - 3$. Then graph the function.

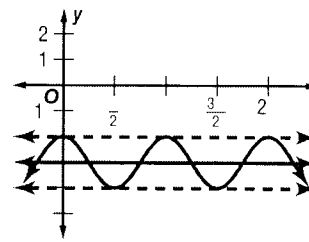
Vertical Shift: $k = -3$, so the vertical shift is 3 units down.

The equation of the midline is $y = -3$.

Amplitude: $|a| = |1|$ or 1

Period: $\frac{2\pi}{|b|} = \frac{2\pi}{|2|}$ or π

Since the amplitude of the function is 1, draw dashed lines parallel to the midline that are 1 unit above and below the midline. Then draw the cosine curve, adjusted to have a period of π .

**Exercises**

State the vertical shift, equation of the midline, amplitude, and period for each function. Then graph the function.

1. $y = \frac{1}{2} \cos \theta + 2$

2. $y = 3 \sin \theta - 2$