

Algebra 2 · Graphs of Trigonometric Functions

· Worksheet

Common Core F-TF.B.5, F-IF.C.7e · mathovore.fr

Name: _____ Date: ____/____/____ Score: _____

This algebra 2 trig graphs worksheet gives 22 problems on graphs of trigonometric functions, ordered from easy to hard, with a separate answer key.

These 22 problems build the skills in standards F-TF.B.5 and F-IF.C.7e. You will evaluate sine and cosine at key angles, find amplitude, period, midline and phase shift, read equations from graphs, and write sinusoidal models.

The exercises move from key values to full equations. The last six are word problems about tides, a Ferris wheel, daylight hours, a buoy, temperature and a spring. Use radian mode on your calculator.

Algebra 2 Common Core: F-TF.B.5 · F-IF.C.7e

Algebra 2 Trig Graphs Worksheet: problems 1-5

Problem 1: Sine at key angles

Evaluate each expression.

- a. $\sin 0$
- b. $\sin \frac{\pi}{2}$
- c. $\sin \pi$
- d. $\sin \frac{3\pi}{2}$
- e. $\sin 2\pi$

Problem 2: Cosine at key angles

Evaluate each expression.

- a. $\cos 0$
- b. $\cos \frac{\pi}{2}$
- c. $\cos \pi$
- d. $\cos \frac{3\pi}{2}$
- e. $\cos 2\pi$

Problem 3: Find the amplitude

State the amplitude of each function.

- a. $y = 4\sin x$
- b. $y = -3\cos x$
- c. $y = \frac{1}{2}\sin x$
- d. $y = 2.5\cos x$

Problem 4: Find the period

Find the period of each function.

- a. $y = \sin 2x$
- b. $y = \cos 4x$
- c. $y = \sin \frac{x}{2}$
- d. $y = \cos(\pi x)$
- e. $y = \sin 3x$

Problem 5: Midline and range

Find the midline and the range of each function.

- a. $y = \sin x + 3$
- b. $y = 2\cos x - 1$
- c. $y = -4\sin x + 2$

Algebra 2 Trig Graphs Worksheet: problems 6-10

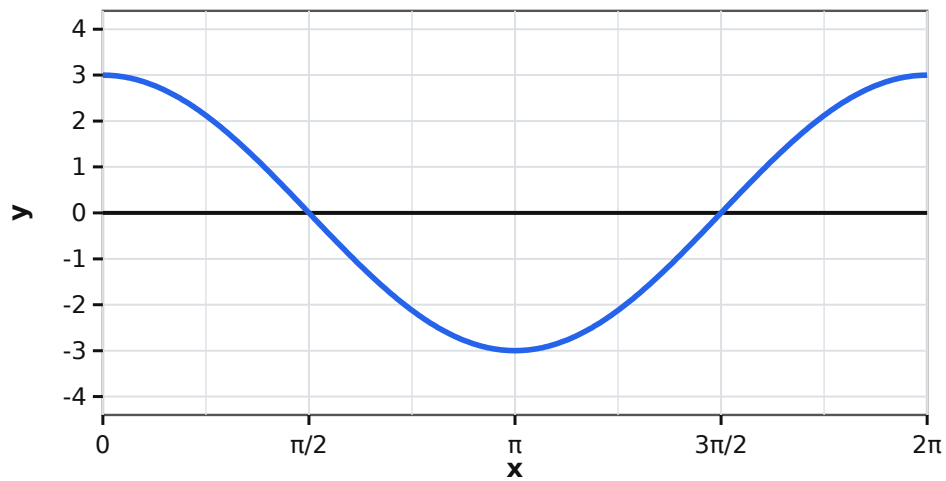
Problem 6: Read the phase shift

Describe the horizontal shift of each graph compared with its parent function.

- a. $y = \sin\left(x - \frac{\pi}{4}\right)$
- b. $y = \cos\left(x + \frac{\pi}{3}\right)$
- c. $y = \sin\left(2\left(x - \frac{\pi}{6}\right)\right)$
- d. $y = \cos\left(x - \frac{3\pi}{2}\right)$

Problem 7: Equation from a cosine graph

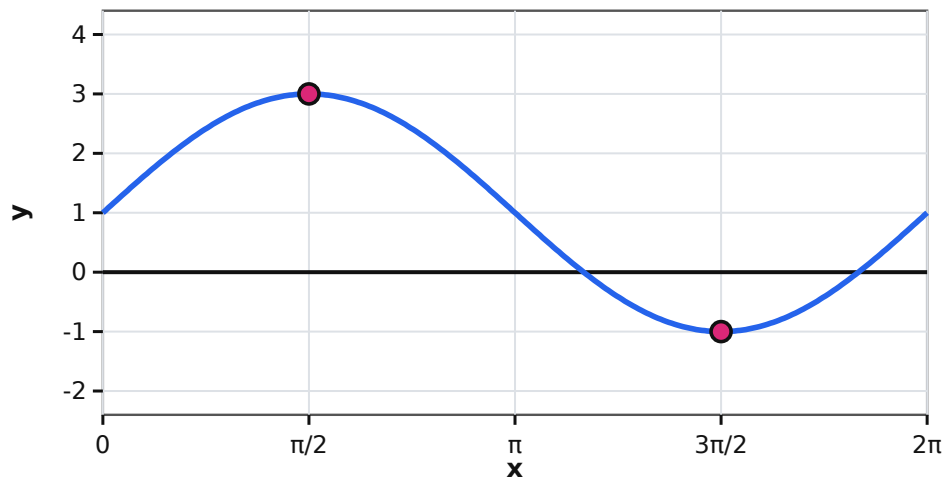
The graph shows $y = A\cos x$. Find A and write the equation.



Cosine wave for Exercise 7.

Problem 8: Midline from a graph

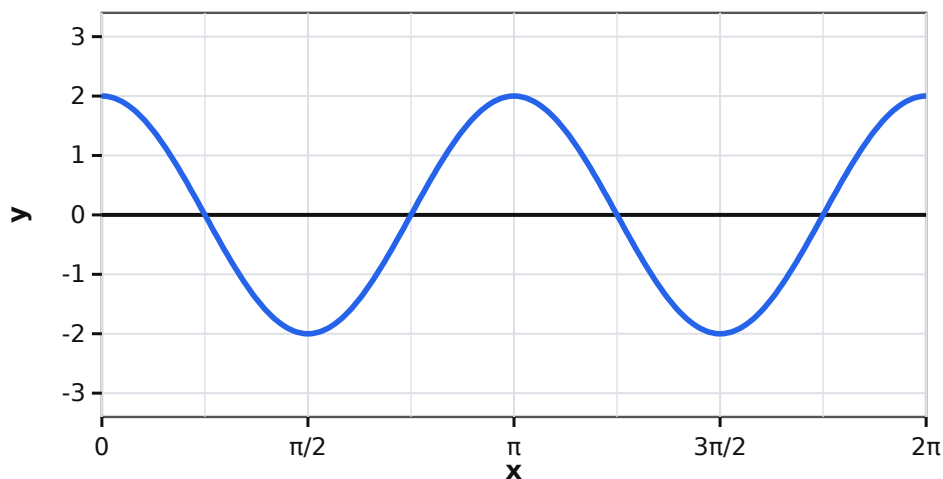
The graph shows a sine wave. Find its maximum, minimum, midline and amplitude, then write its equation in the form $y = A\sin x + D$.



Sine wave for Exercise 8.

Problem 9: Period from a graph

Find the period of the graph and the value of B , then write an equation of the form $y = A\cos(Bx)$.



Cosine wave for Exercise 9.

Problem 10: Evaluate a sinusoid

Let $f(x) = 2\sin x + 1$. Find each value.

- $f\left(\frac{\pi}{6}\right)$
- $f\left(\frac{\pi}{2}\right)$
- $f\left(\frac{7\pi}{6}\right)$
- $f\left(\frac{3\pi}{2}\right)$

Algebra 2 Trig Graphs Worksheet: problems 11-15

Problem 11: Maximum and minimum values

Find the maximum and minimum value of each function.

- $y = 5\sin x + 2$
- $y = -2\cos x - 1$

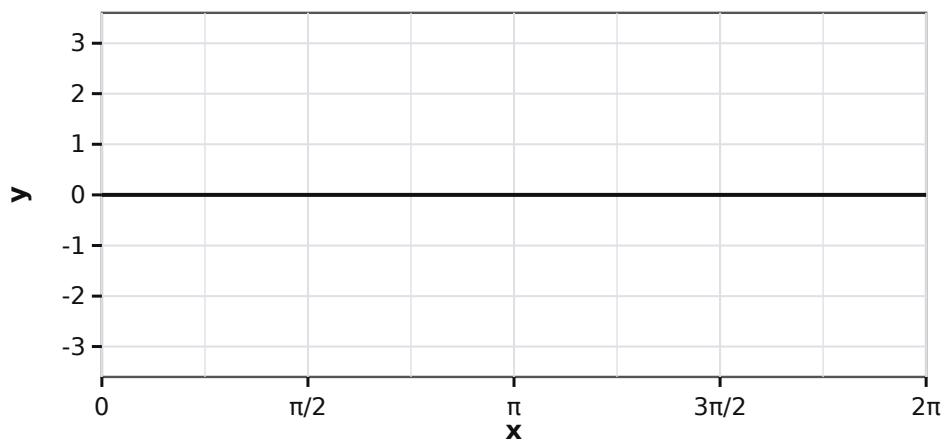
Problem 12: Three features at once

Find the amplitude, period and midline of $y = 3\cos(4x) - 2$.

Problem 13: Plot key points

Complete the table of values for $y = 3\sin x$, plot the five points on the grid, and sketch one full cycle.

x	0	$\frac{\pi}{2}$	π	$\frac{3\pi}{2}$	2π
y					



Grid for Exercise 13.

Problem 14: All four features

Find the amplitude, period, phase shift and midline of $y = -3\sin\left(2\left(x + \frac{\pi}{4}\right)\right) + 1$. Then state its maximum and minimum values.

Problem 15: Write a sine equation

Write an equation of the form $y = A\sin(Bx) + D$ for a sine wave with amplitude 4, period π and midline $y = 1$.

Algebra 2 Trig Graphs Worksheet: problems 16-20

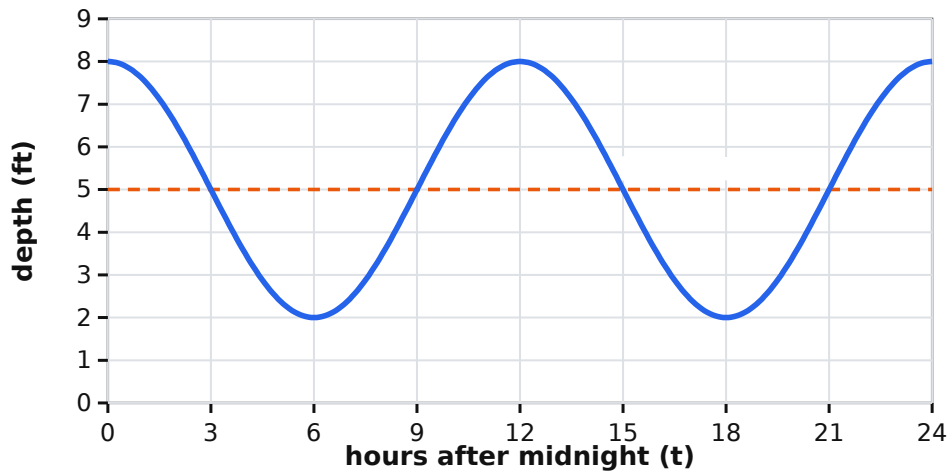
Problem 16: Write a cosine equation

A cosine wave has maximum value 8, minimum value 2 and period 8. Write an equation of the form $y = A\cos(Bx) + D$ with $A > 0$.

Problem 17: Tide model

The depth of water at a harbor pier is $D(t) = 5 + 3\cos\left(\frac{\pi t}{6}\right)$ feet, where t is the number of hours after midnight.

- Find the amplitude, period and midline.
- Find the highest and lowest depths.
- Find $D(2)$ and $D(4)$.

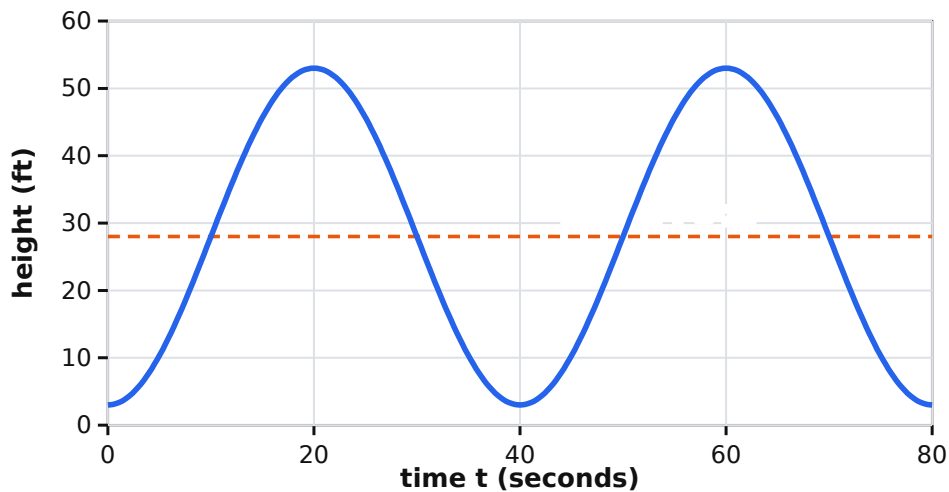


Tide depth over one day for Exercise 17.

Problem 18: Ferris wheel

Maya rides a Ferris wheel whose height above the ground is $h(t) = 28 - 25\cos\left(\frac{\pi t}{20}\right)$ feet after t seconds.

- How many seconds does one full turn take?
- Find the lowest and highest heights.
- Find Maya's height at $t=10$ and at $t=5$. Round to the nearest tenth.



Wheel height for Exercise 18.

Problem 19: Daylight hours

In Seattle, the number of daylight hours on day t of the year is modeled by

$$D(t) = 12 + 2.5\sin\left(\frac{2\pi(t-80)}{365}\right).$$

- Find the amplitude, period, midline and phase shift.
- Find the longest and shortest number of daylight hours.
- Find $D(125)$ to the nearest tenth of an hour.

Problem 20: Bobbing buoy

A buoy bobs between 14 ft and 8 ft above the ocean floor. It reaches its highest point at $t = 0$ seconds and completes one cycle every 4 seconds.

- Write a model $h(t) = A\cos(Bt) + D$ with $A > 0$.
- Find the height at $t = 1.5$ seconds. Round to the nearest tenth.
- Find the first time the buoy is at the midline height.

Algebra 2 Trig Graphs Worksheet: problems 21-22

Problem 21: Daily temperature

Jamal models the temperature in his town as $T(t) = 62 + 14\sin\left(\frac{\pi(t-9)}{12}\right)$ degrees Fahrenheit, where t is the number of hours after midnight.

- Find the highest and lowest temperatures, and the times they occur in the first 24 hours.
- Find the temperature at noon, to the nearest tenth of a degree.
- Find the times in the first 24 hours when the temperature equals 62°F .

Problem 22: Spring and weight

A weight on a spring hangs $h(t) = 30 + 6\cos\left(\frac{2\pi t}{3}\right)$ inches above a table after t seconds.

- Find the amplitude and the period.
- Find $h(1)$.
- Find all times in the first 3 seconds when the weight is 33 inches above the table.

How to use this algebra 2 trig graphs worksheet

Print this algebra 2 trig graphs worksheet as a PDF, solve every problem on paper, then compare with the answer key.

