

Precalculus · Graphs of Trigonometric Functions · Worksheet

Common Core F-TF.B.5, F-IF.C.7e, F-BF.B.3 · mathovore.fr

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

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

These problems practice graphing sine, cosine, and tangent, reading amplitude, period, phase shift, and midline from equations and graphs, and building models from data (F-TF.B.5, F-IF.C.7e, F-BF.B.3).

The set moves from basic features to writing equations from graphs. The last six problems use tides, a Ferris wheel, temperature, daylight, and a lighthouse. Show every step.

Precalculus Common Core: F-TF.B.5 · F-IF.C.7e · F-BF.B.3

Precalculus Trig Graphs Worksheet: problems 1-5

Problem 1: Amplitude of a wave

State the amplitude of each function.

- a. $y = 4\sin x$
- b. $y = -3\cos x$
- c. $y = \frac{1}{2}\sin 2x$
- d. $y = 5\cos x + 2$

Problem 2: Period from B

Find the period of each function.

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

Problem 3: Midline and range

State the midline and the range of each function.

- a. $y = 2\sin x + 3$
- b. $y = -4\cos x - 1$
- c. $y = \frac{1}{2}\sin x - 2$
- d. $y = 3\cos 2x + 0.5$

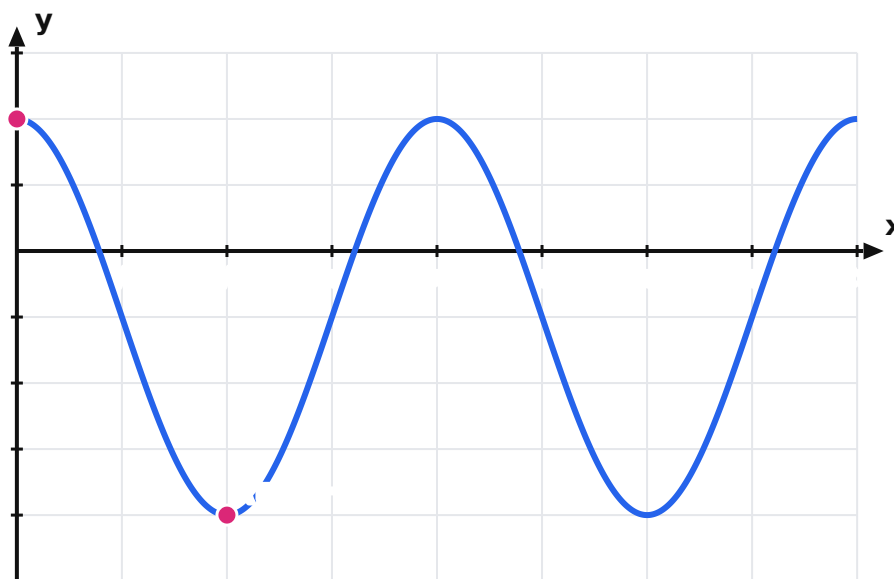
Problem 4: Five key points

Evaluate each function at $x = 0, \frac{\pi}{2}, \pi, \frac{3\pi}{2}, 2\pi$.

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

Problem 5: Read a cosine graph

The graph shows a cosine wave. State the amplitude, period, and midline, then write an equation of the form $y = A\cos(Bx) + D$.



Cosine wave with a maximum and a minimum marked.

Precalculus Trig Graphs Worksheet: problems 6-10

Problem 6: Graph a reflected sine

Graph one full period of $y = -2\sin x$ on $0 \leq x \leq 2\pi$. Label the five key points.

Problem 7: Describe transformations

Describe how the graph of each function is obtained from its parent function.

- a. $y = -\frac{1}{2}\cos x + 3$ from $y = \cos x$

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

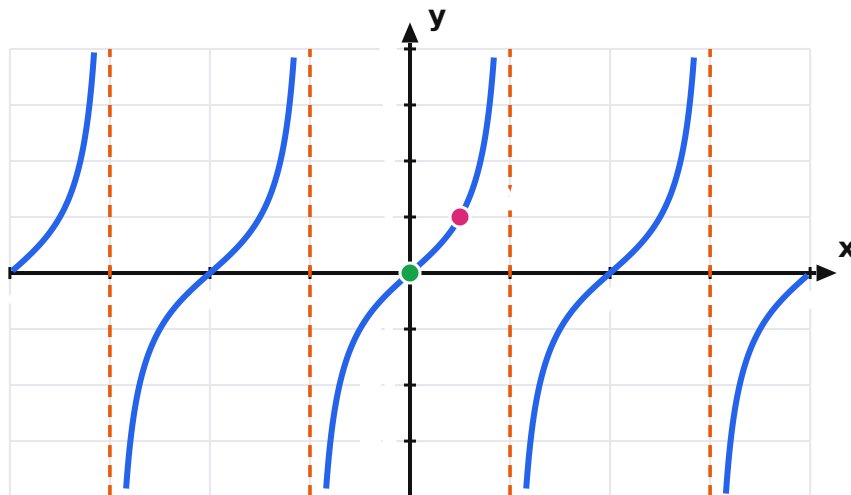
Problem 8: Phase shift

State the phase shift, with direction, of each function.

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

Problem 9: Read a tangent graph

The graph shows a function of the form $y = A \tan(Bx)$. State its period and its asymptotes, then write its equation.



Tangent-shaped curve through the origin and the point marked.

Problem 10: Tangent period and asymptotes

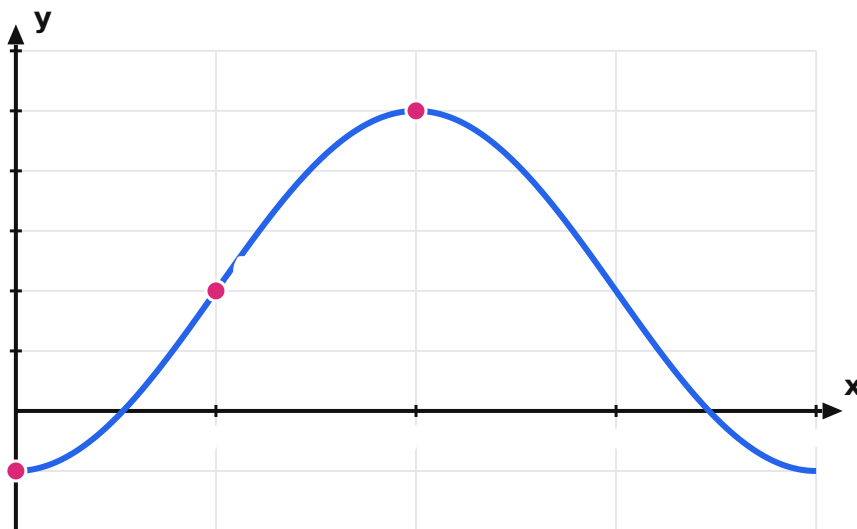
For each function, find the period and the two asymptotes closest to the y-axis.

- a. $y = \tan 3x$
 b. $y = \tan\left(\frac{x}{2}\right)$

Precalculus Trig Graphs Worksheet: problems 11-15

Problem 11: Write a sine from a graph

The graph shows one cycle of a sine wave. Write an equation of the form $y = A \sin(B(x - C)) + D$.



Wave through three marked points.

Problem 12: Evaluate a sinusoid

Let $f(x) = 3\sin 2x + 1$. Find each value.

- $f\left(\frac{\pi}{12}\right)$
- $f\left(\frac{\pi}{4}\right)$
- $f\left(\frac{\pi}{2}\right)$
- $f\left(\frac{3\pi}{4}\right)$

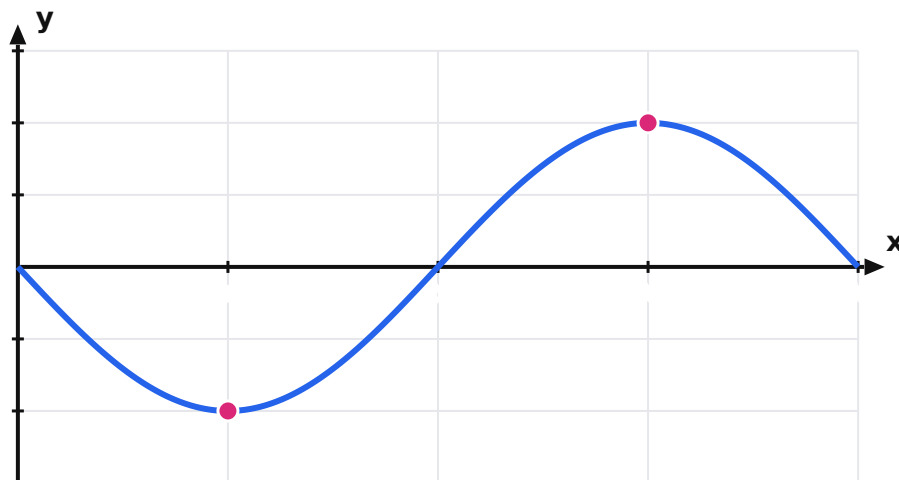
Problem 13: Write an equation

Write a sine or cosine function that has the given features.

- Amplitude 5, period π , midline $y = -2$, passes through $(0, -2)$ going up.
- Amplitude 3, period 8π , midline $y = 1$, maximum at $x = 0$.
- Amplitude 2, period 6, midline $y = 0$, passes through $(0, 0)$ going up.

Problem 14: Identify B from a graph

The graph shows a sine wave that is reflected. State the amplitude and period, then write its equation in the form $y = A\sin(Bx)$.



Wave through $(\pi, -2)$ and $(3\pi, 2)$.

Problem 15: Shifted tangent

Consider $y = 2\tan\left(x - \frac{\pi}{4}\right) + 1$. Find the asymptotes between $x = -\frac{\pi}{2}$ and $x = \pi$, the center point, and the points where $x = 0$ and $x = \frac{\pi}{2}$. Then sketch the graph.

Precalculus Trig Graphs Worksheet: problems 16-20

Problem 16: Domain of a tangent

State the domain of $y = \tan 2x$.

Problem 17: Ferris wheel height

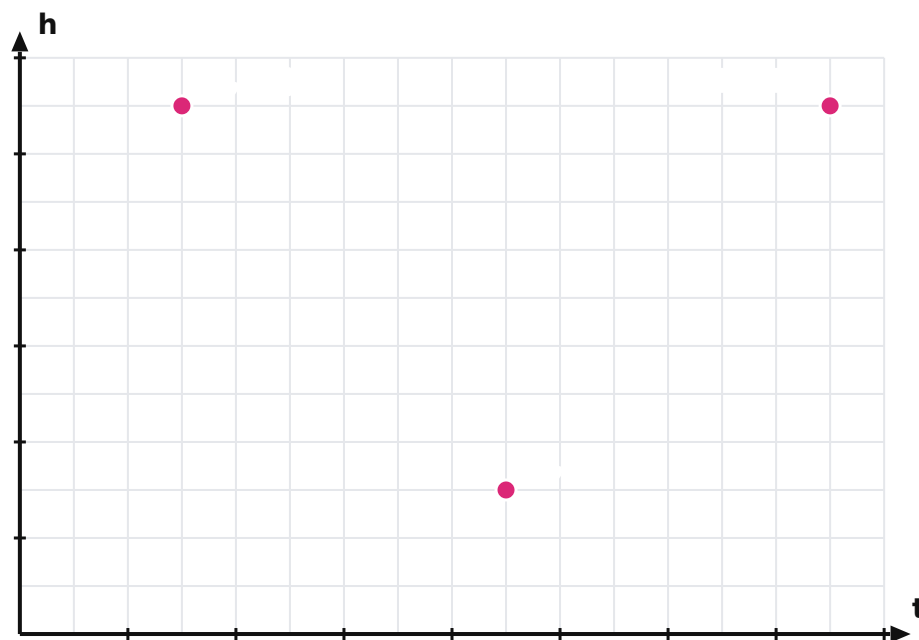
Maya rides a Ferris wheel. Her height in feet is $h(t) = -40\cos\left(\frac{\pi t}{2}\right) + 50$, where t is in minutes.

- State the amplitude, period, and midline.
- Find her height at $t = 1$ and at $t = 2$.
- Find her height at $t = 0.5$ to the nearest tenth of a foot.

Problem 18: Tide model

The graph shows the height h of the tide, in feet, at a harbor. High tide is 11 ft at hour 3 and low tide is 3 ft at hour 9.

- Find A , D , the period, and B .
- Write $h(t)$ as a cosine function.
- Find the height at $t = 1$ and at $t = 6$.



Tide readings at the harbor.

Problem 19: Monthly temperature

In Denver the average temperature is coldest in January (30°F , month 1) and warmest in July (74°F , month 7). Write a cosine model $T(m)$ and use it to predict the average temperature in April ($m=4$) and September ($m=9$).

Problem 20: Bobbing buoy

A buoy rises and falls 1.5 ft above and below its resting level and completes one cycle every 5 seconds. At $t=0$ it is at rest level moving up. Write a model $y(t)$ and find the displacement at $t=1.25$, $t=2.5$, and $t=0.625$ (nearest tenth).

Precalculus Trig Graphs Worksheet: problems 21-22

Problem 21: Hours of daylight

In Seattle the length of daylight $D(t)$ in hours is modeled by $D(t) = 4\cos\left(\frac{2\pi}{365}(t-172)\right) + 12$, where t is the day of the year.

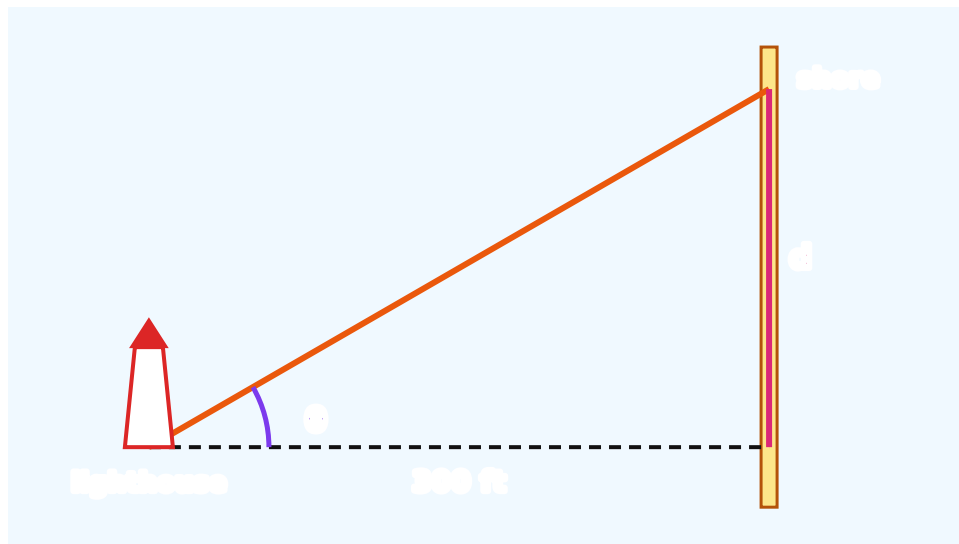
- State the amplitude, midline, and period.
- Find $D(80)$ (March 21) and $D(1)$ (January 1) to the nearest tenth of an hour.

Problem 22: Lighthouse beam

A lighthouse stands 300 ft from a straight shore. Its beam makes angle θ with the line perpendicular to the shore, so the beam hits the shore a distance $d = 300\tan\theta$ feet from the

point straight across.

- Find d for $\theta = \frac{\pi}{6}$, $\frac{\pi}{4}$, and $\frac{\pi}{3}$ (nearest tenth).
- Find d when $\theta = 1.5$ radians. Explain what happens as θ approaches $\frac{\pi}{2}$.



Lighthouse, shore, and beam.

How to use this precalculus trig graphs worksheet

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

