

Precalculus · Graphs of Trigonometric Functions · Test Answer Key

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

This precalculus trig graphs test answer key gives the full solution and the scoring guide for each of the 9 test questions on graphs of trigonometric functions.

Use this key to score the test out of 20 points. Each solution gives the worked answer and a scoring guide. Accept equivalent forms, such as a sine function with the correct shift in place of a cosine function.

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

Precalculus Trig Graphs Test Answer Key: questions 1-5

Question 1: Features of a cosine (2 points)

- a. Amplitude **4**; period $\frac{2\pi}{1/3} = 6\pi$
- b. Midline $y = 2$; maximum $2+4 = \mathbf{6}$; minimum $2-4 = \mathbf{-2}$

Scoring: 1 point for each part; in part (b) all three values must be correct.

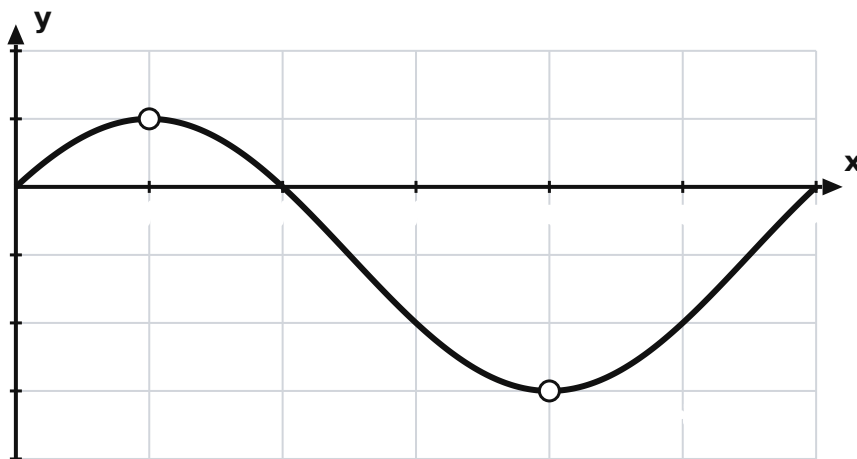
Question 2: Phase shift (2 points)

- a. $y = 2\sin\left(3\left(x - \frac{\pi}{3}\right)\right)$: period $\frac{2\pi}{3}$, phase shift $\frac{\pi}{3}$ **to the right**
- b. $2\sin\left(\frac{3\pi}{2} - \pi\right) = 2\sin\frac{\pi}{2} = \mathbf{2}$

Scoring: Part (a): 1 point for the factored form or the correct shift together with the period. Part (b): 1 point.

Question 3: Equation from a graph (3 points)

- a. Amplitude $\frac{1 - (-3)}{2} = \mathbf{2}$; midline $y = \frac{1 + (-3)}{2} = \mathbf{-1}$
- b. Maximum at $\frac{\pi}{6}$, minimum at $\frac{2\pi}{3}$: half a period is $\frac{\pi}{2}$, so the period is π
- c. $B = 2$, $C = \frac{\pi}{6}$: $y = 2\cos\left(2\left(x - \frac{\pi}{6}\right)\right) - 1$

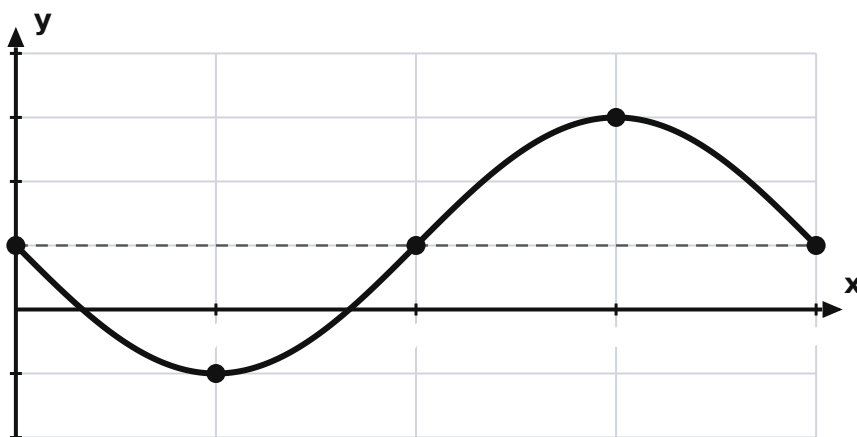


Graph used in the solution.

Scoring: 1 point per part. Part (c) needs correct A , B , C , and D ; allow an equivalent shift of the maximum.

Question 4: Sketch a sinusoid (2 points)

Amplitude 2, reflected; period π ; midline $y=1$. Key points: $(0,1)$, $(\frac{\pi}{4},-1)$, $(\frac{\pi}{2},1)$, $(\frac{3\pi}{4},3)$, $(\pi,1)$.



Sketch of the answer.

Scoring: 1 point for the key points plotted correctly; 1 point for a smooth curve of the correct shape.

Question 5: Tangent features (3 points)

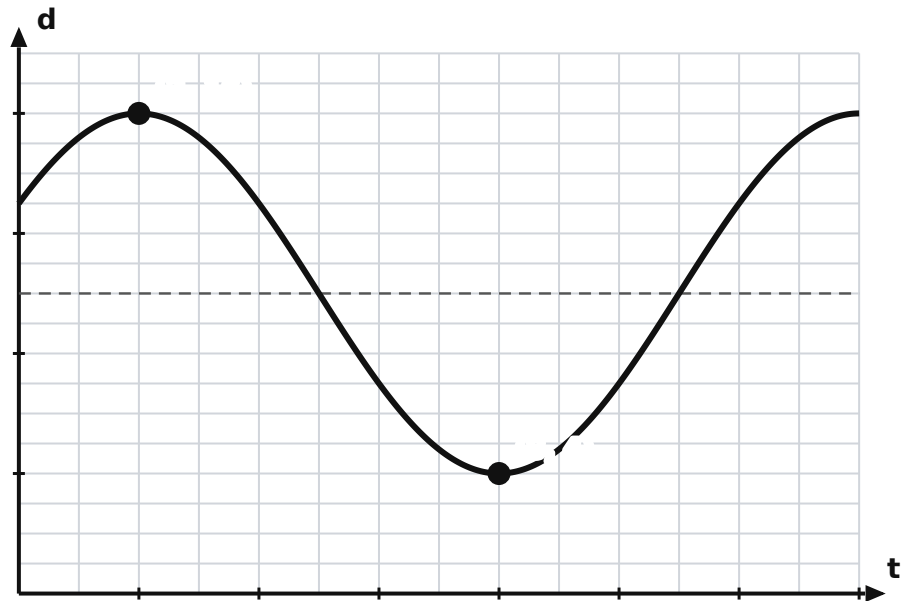
- $\frac{\pi}{2}$
- $2x = \pm \frac{\pi}{2}$: $x = \pm \frac{\pi}{4}$
- $3 \tan \frac{\pi}{4} = 3$

Scoring: 1 point per part.

Precalculus Trig Graphs Test Answer Key: questions 6-9

Question 6: Water depth model (3 points)

- a. $A = \frac{16-4}{2} = 6$; $D = \frac{16+4}{2} = 10$
b. Period $2(8-2) = 12$, $B = \frac{\pi}{6}$; $d(t) = 6\cos\left(\frac{\pi}{6}(t-2)\right) + 10$
c. $d(5) = 6\cos\frac{\pi}{2} + 10 = 10$ ft



Model through the readings.

Scoring: 1 point per part. In part (b), award the point for an equivalent equation, such as a sine with the correct shift.

Question 7: Transformations (2 points)

Reflect across the x-axis, shrink vertically by a factor of $\frac{1}{2}$, shift left $\frac{\pi}{4}$, and shift up 3.

Scoring: Half a point for each of the four transformations, rounded to the nearest whole point; direction errors lose the half point.

Question 8: Daily temperature (2 points)

$$A = \frac{104-80}{2} = 12, D = \frac{104+80}{2} = 92, \text{ period } 24 \text{ so } B = \frac{\pi}{12}.$$

$$T(t) = 12\cos\left(\frac{\pi}{12}(t-15)\right) + 92; T(9) = 12\cos\left(-\frac{\pi}{2}\right) + 92 = 92^\circ\text{F}$$

Scoring: 1 point for the model (A , D , B , and shift correct); 1 point for the value at 9 a.m.

Question 9: No amplitude (1 point)

The tangent values grow without bound near each asymptote, so there is no maximum or minimum from which to measure the amplitude.

Scoring: 1 point for noting that the function is unbounded (no maximum or minimum).

Scoring summary

Total
20 points: add the points of every question of this precalculus trig graphs test answer key.

How to use this precalculus trig graphs test answer key

Use this precalculus trig graphs test answer key to score the test fairly and to see which skills need more practice.

