

Algebra 2 · Graphs of Trigonometric Functions

· Test Answer Key

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

This algebra 2 trig 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 full reasoning and a scoring guide. Award partial credit only where the guide says so, and check that answers carry the correct units and signs.

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

Algebra 2 Trig Test Answer Key: questions 1-5

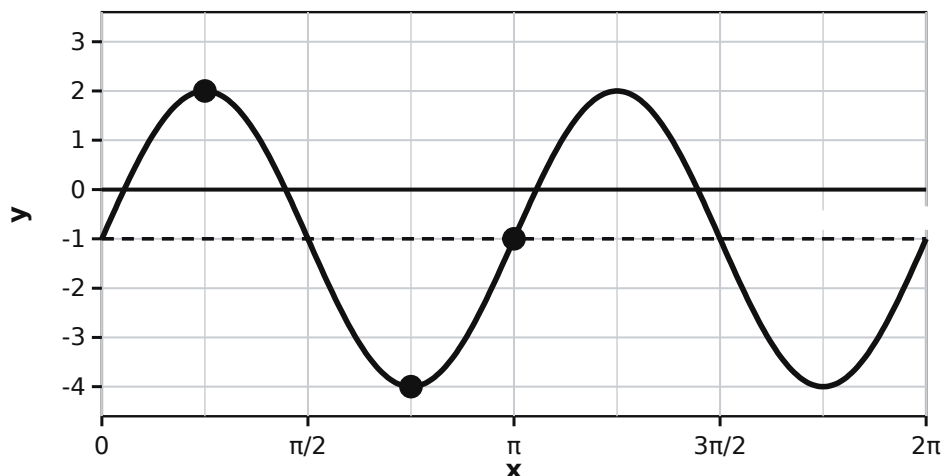
Question 1: Features of a sinusoid (2 points)

- a. $|A| = |-2| = 2$; midline $y = 4$.
- b. Period $\frac{2\pi}{3}$; the factored form shows a shift **right** $\frac{\pi}{6}$.

Scoring: 1 point for amplitude and midline; 1 point for period and phase shift (both values in each part needed).

Question 2: Equation from a graph (2 points)

- a. Max 2, min -4 : midline $\frac{2+(-4)}{2} = y = -1$, amplitude $\frac{2-(-4)}{2} = 3$.
- b. One cycle spans 0 to π , so $B = \frac{2\pi}{\pi} = 2$. The wave rises first from the midline at $x = 0$, so $y = 3\sin(2x) - 1$.



Midline and extreme values.

Scoring: 1 point for midline and amplitude; 1 point for the correct equation (A, B and D all correct).

Question 3: Evaluate exactly (2 points)

a. $4\cos\frac{\pi}{3}-2=4\cdot\frac{1}{2}-2=0$.

b. $4\cos\pi-2=4(-1)-2=-6$.

Scoring: 1 point for each correct exact value, with the substitution shown.

Question 4: Write a cosine model (2 points)

$$A = \frac{9-(-1)}{2} = 5; D = \frac{9+(-1)}{2} = 4; B = \frac{2\pi}{6} = \frac{\pi}{3}.$$

$$y = 5\cos\left(\frac{\pi}{3}x\right) + 4$$

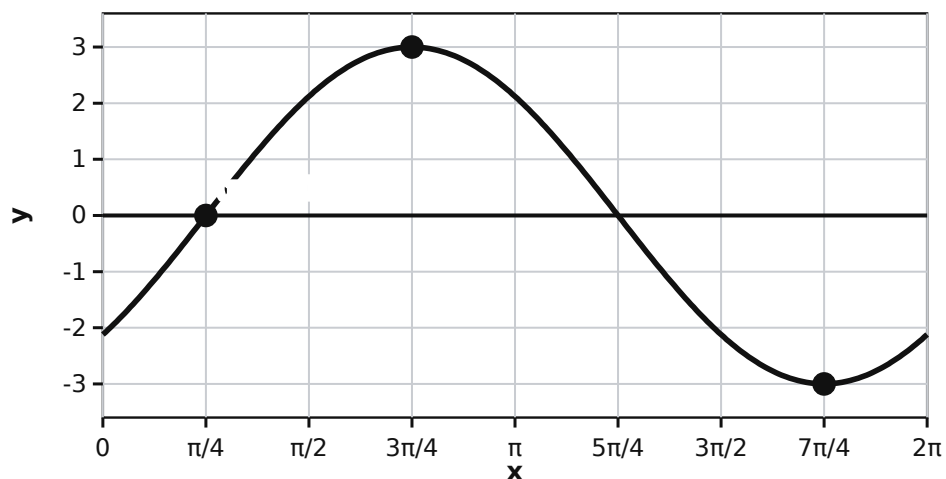
Check: $x=0$ gives 9 and $x=3$ gives $5\cos\pi+4=-1$.

Scoring: 1 point for A and D; 1 point for B and the complete equation.

Question 5: Phase shift from a graph (2 points)

The maximum is 3, so $A=3$. The wave crosses the midline going up at $x=\frac{\pi}{4}$, so $C=\frac{\pi}{4}$ (check: maximum at $\frac{\pi}{4}+\frac{\pi}{2}=\frac{3\pi}{4}$).

$$A=3, C=\frac{\pi}{4}, y=3\sin\left(x-\frac{\pi}{4}\right)$$



Key points.

Scoring: 1 point for A; 1 point for C and the equation.

Algebra 2 Trig Test Answer Key: questions 6-9

Question 6: Compare two sine waves (2 points)

- a. $f: 2\pi$. $g: \frac{2\pi}{2} = \pi$.
b. Cycles $= \frac{2\pi}{\text{period}}$: f makes **2** cycles and g makes **4** cycles.

Scoring: 1 point for both periods; 1 point for both cycle counts.

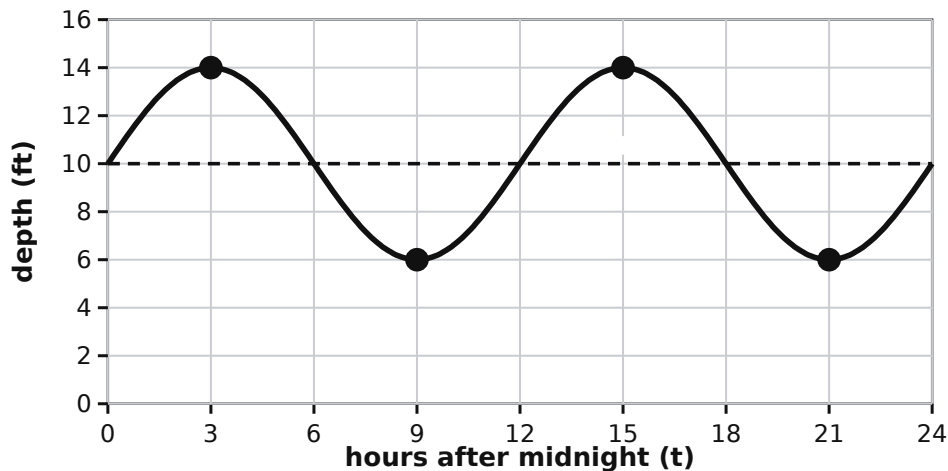
Question 7: Ferris wheel height (3 points)

- a. Lowest $30 - 22 = \mathbf{8 \text{ ft}}$; highest $30 + 22 = \mathbf{52 \text{ ft}}$.
b. Period $\frac{2\pi}{\pi/18} = \mathbf{36 \text{ seconds}}$.
c. $h(6) = 30 - 22\cos\frac{\pi}{3} = 30 - 11 = \mathbf{19 \text{ ft}}$.

Scoring: 1 point per part.

Question 8: Harbor depth model (3 points)

- a. Max 14, min 6: amplitude **4**, midline $y = 10$. Two maxima at $t = 3$ and $t = 15$: period **12** hours.
b. $B = \frac{2\pi}{12} = \frac{\pi}{6}$. The first maximum is at $t = 3$, so $C = 3$: $D(t) = 4\cos\left(\frac{\pi}{6}(t-3)\right) + 10$.
c. $D(5) = 4\cos\frac{\pi}{3} + 10 = 2 + 10 = \mathbf{12 \text{ ft}}$.



Key points of the depth curve.

Scoring: 1 point per part (part a needs all three values).

Question 9: Temperature model (2 points)

- a. The maximum is $60 + 12 = \mathbf{72^\circ\text{F}}$ when $\frac{\pi(t-8)}{12} = \frac{\pi}{2}$, so first at $t = 14$ (2 p.m.).
b. $T(11) = 60 + 12\sin\frac{\pi}{4} \approx 60 + 8.49 = \mathbf{68.5^\circ\text{F}}$.

Scoring: 1 point for the maximum and its time; 1 point for the temperature at $t = 11$.

Scoring summary

Total
20 points: add the points of every question of this algebra 2 trig test answer key.

How to use this algebra 2 trig test answer key

Use this algebra 2 trig test answer key to score the test fairly and to see which skills need more practice.

