

# Precalculus - Graphs of Trigonometric Functions - Test Answer Key

Common Core F-TF.B.5, F-IF.C.7e, F-TF.B.7 · [maths-pdf.fr/en/](https://maths-pdf.fr/en/)

Worked solutions and scoring notes for the 9-question trig graphs test. Use the scoring line under each solution to award partial credit.

**Precalculus** · Common Core State Standards: **F-TF.B.5, F-IF.C.7e, F-TF.B.7**

## Question 1 - Read the equation [2 pts]

Amplitude 3.  $b = \frac{\pi}{2}$ , so the period is  $\frac{2\pi}{\pi/2} = 4$ . Midline  $y = 4$ .

3; 4;  $y = 4$

Scoring: 1 point for amplitude and midline, 1 point for the period.

## Question 2 - Phase shift [2 pts]

$\cos\left(2\left(x - \frac{\pi}{4}\right)\right)$ . Period  $\frac{2\pi}{2} = \pi$ . Shift  $\frac{\pi}{4}$  right.

$\cos\left(2\left(x - \frac{\pi}{4}\right)\right)$ ; **period  $\pi$ ; shift  $\frac{\pi}{4}$  right**

Scoring: 1 point for factoring, 1 point for period and shift.

## Question 3 - Evaluate [2 pts]

$4\cos 0 = 4$ .  $4\cos \frac{\pi}{2} = 0$ .  $4\cos \pi = -4$ .

4, 0, -4

Scoring: 1 point for two correct values, 2 points for all three.

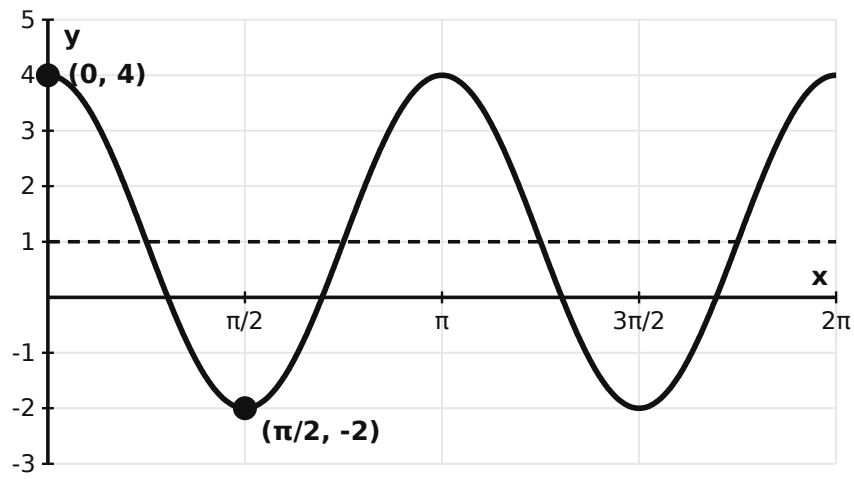
## Question 4 - Tangent [2 pts]

Period  $\frac{\pi}{3}$ . Asymptote when  $3x = \frac{\pi}{2}$ .

$\frac{\pi}{3}$ ;  $x = \frac{\pi}{6}$

Scoring: 1 point each.

### Question 5 - Read a trig graph [3 pts]



Max 4, min -2, period  $\pi$ .

(a) Amplitude  $\frac{4-(-2)}{2}=3$ ; period  $\pi$ . (b) Midline  $y=1$ ; range  $[-2,4]$ . (c)  $b=\frac{2\pi}{\pi}=2$ .

$3, \pi; y=1, [-2,4]; y=3\cos 2x+1$

Scoring: 1 point for each part.

### Question 6 - Write an equation [2 pts]

$$b = \frac{2\pi}{6\pi} = \frac{1}{3}.$$

$$y = 4\sin \frac{x}{3}$$

Scoring: 1 point for the amplitude, 1 point for  $b$ .

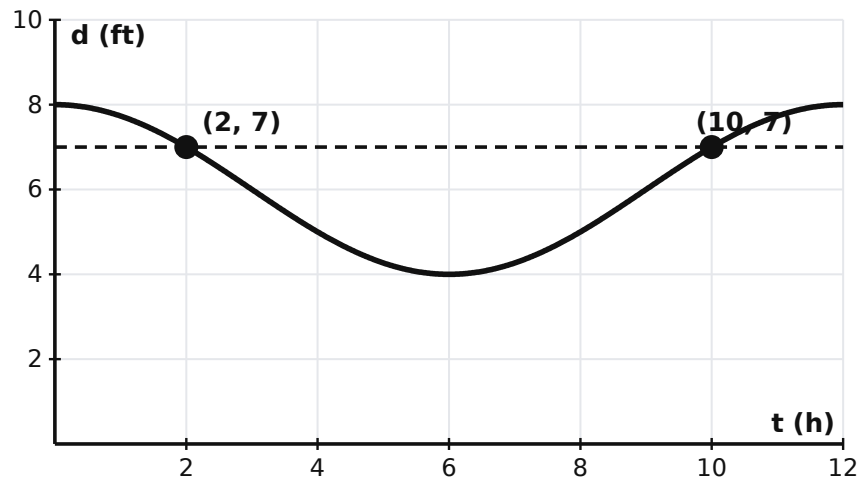
### Question 7 - Range [2 pts]

$-2\sin x$  ranges over  $[-2,2]$ . Add 3.

$[1,5]$

Scoring: 1 point for the amplitude step, 1 point for the range.

### Question 8 - Tide model [3 pts]



Depth is 7 ft at  $t = 2$  and  $t = 10$ .

(a)  $d(3) = 6 + 2\cos\frac{\pi}{2} = 6$ . (b)  $\frac{2\pi}{\pi/6} = 12$  h. (c)  $2\cos\frac{\pi d}{6} = 1$ , so  $\cos\frac{\pi d}{6} = \frac{1}{2}$ ,  $\frac{\pi d}{6} = \frac{\pi}{3}$  or  $\frac{5\pi}{3}$ , giving  $t = 2$  or  $t = 10$ .

**6 ft; 12 h;  $t = 2$  and  $t = 10$**

*Scoring: 1 point for each part.*

### Question 9 - Ferris wheel [2 pts]

Greatest height  $25 + 20 = 45$  ft.  $h(10) = 25 - 20\cos\frac{\pi}{2} = 25$  ft.

**45 ft; 25 ft**

*Scoring: 1 point each.*

**Total**

**20 points**