

Graphing Trig Functions Test Review

Find the key information.

1. $y = 4 - 2\sin x$

Vertical shift: up 4 Sinusoidal axis: $y = 4$ Reflected? yes
 Amplitude: 2 Domain: $(-\infty, \infty)$ Range: $[2, 6]$
 Period: 2π Horizontal shift: none

2. $y = -1 + 3\cos 2(x + \pi)$

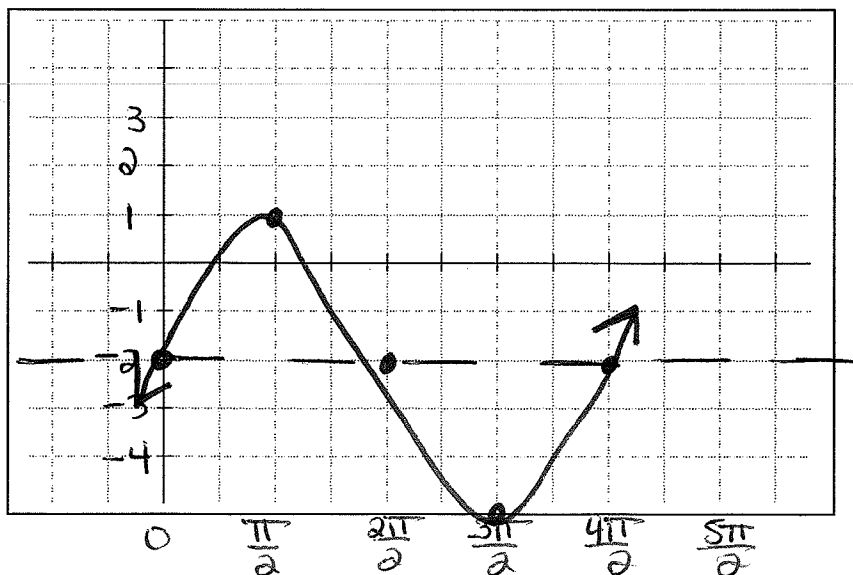
Vertical shift: down 1 Sinusoidal axis: $y = -1$ Reflected? no
 Amplitude: 3 Domain: $(-\infty, \infty)$ Range: $[-5, 1]$

$\frac{2\pi}{2} = \pi$ Period: π Horizontal shift: left π

Find the key information and sketch the graph of the function.

3. $y = -2 + 3\sin x$

Vertical shift: down 2 Sinusoidal axis: $y = -2$ Reflected? no
 Amplitude: 3 Domain: $(-\infty, \infty)$ Range: $[-5, 1]$
 Period: 2π Horizontal shift: none

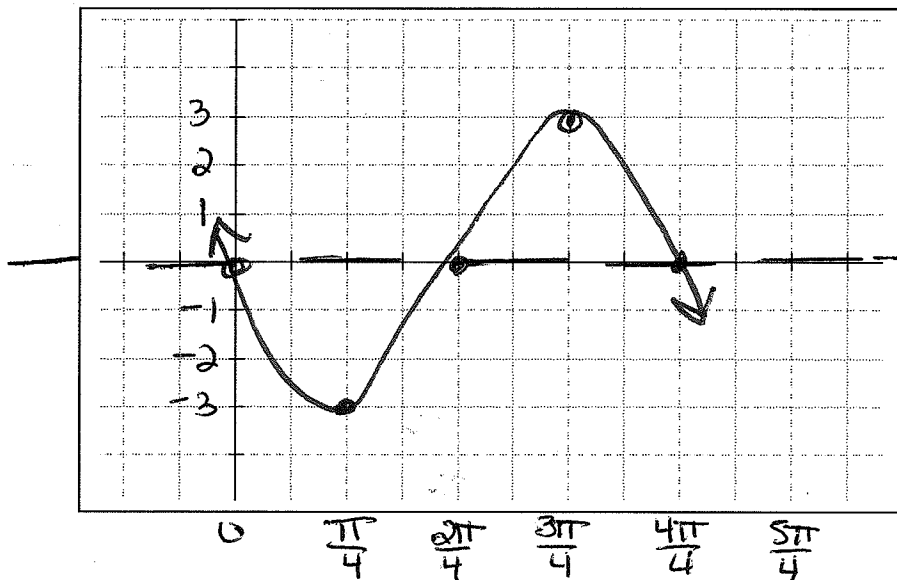


$2\pi \cdot \frac{1}{4} = \frac{2\pi}{4} = \frac{\pi}{2}$

4. $y = -3\sin 2x$

Vertical shift: none Sinusoidal axis: $y=0$ Reflected? yes
 Amplitude: 3 Domain: $(-\infty, \infty)$ Range: $[-3, 3]$

$\frac{2\pi}{2} = \pi$ Period: π Horizontal shift: none

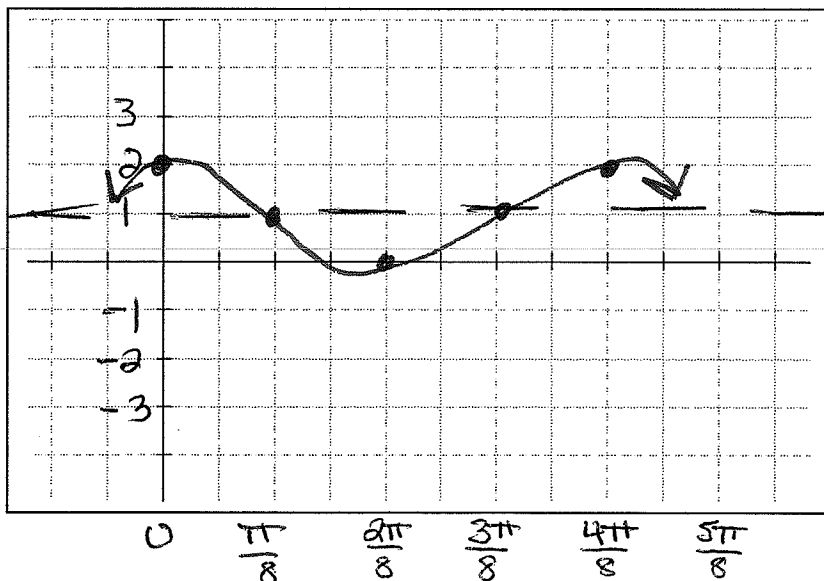


$\pi \cdot \frac{1}{4} = \frac{\pi}{4}$

5. $y = 1 + \cos 4x$

Vertical shift: up 1 Sinusoidal axis: $y=1$ Reflected? no
 Amplitude: 1 Domain: $(-\infty, \infty)$ Range: $[0, 2]$

$\frac{2\pi}{4} = \frac{\pi}{2}$ Period: $\frac{\pi}{2}$ Horizontal shift: none



$\frac{\pi}{2} \cdot \frac{1}{4} = \frac{\pi}{8}$

6. $y = -4 \cos(x - \pi)$

Vertical shift: none

Sinusoidal axis: $y = 0$

Reflected? yes

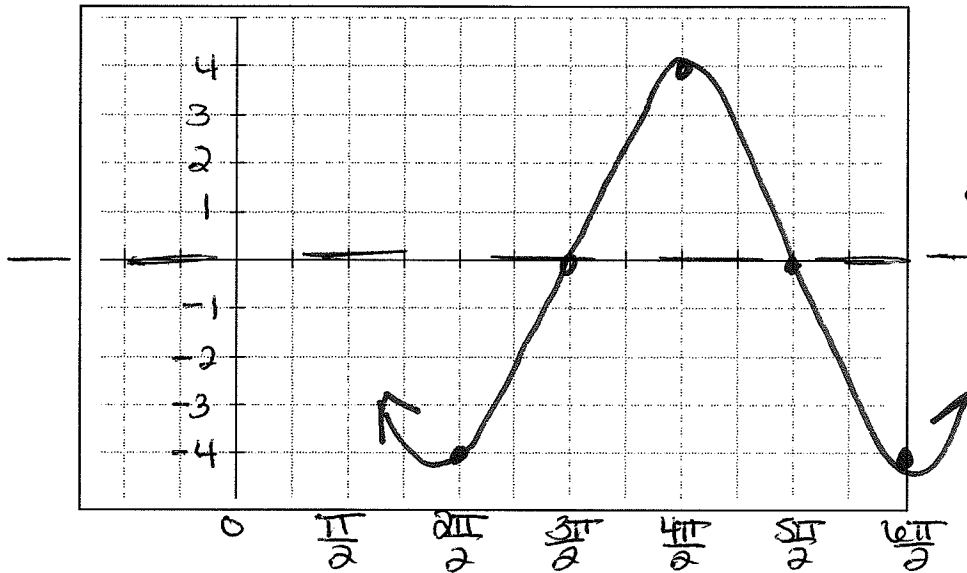
Amplitude: 4

Domain: $(-\infty, \infty)$

Range: $[-4, 4]$

Period: 2π

Horizontal shift: right π



$2\pi \cdot \frac{1}{4} = \frac{2\pi}{4} = \frac{\pi}{2}$

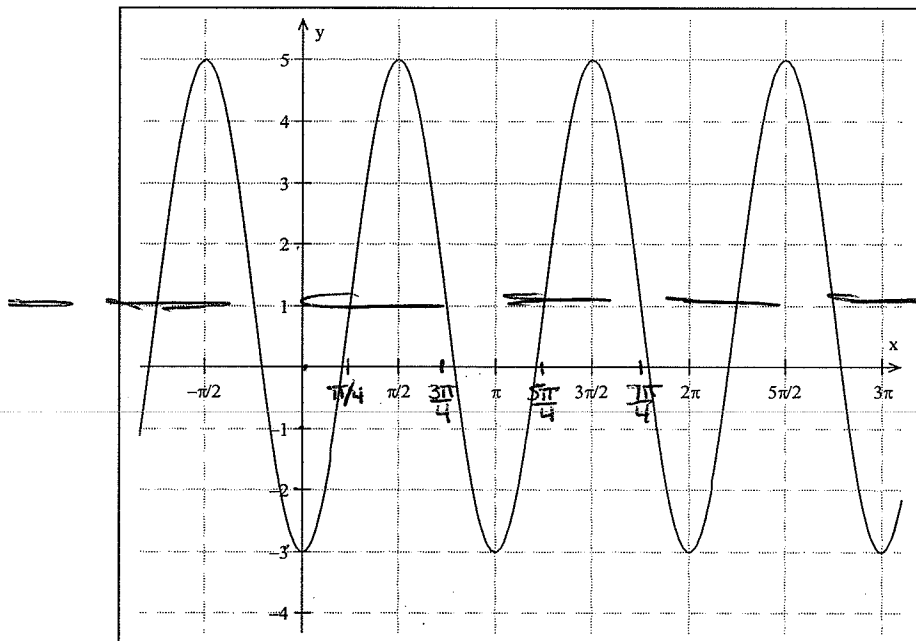
7. Use the given graph to find the key information and write the equation as a sine function and as a cosine function.

Vertical shift: up 1

Sinusoidal axis: $y = 1$

Amplitude: 4

Period: π



~~$\frac{2\pi}{b} = \frac{\pi}{1}$~~

~~$\frac{2\pi}{\pi} = \frac{b \cdot \pi}{\pi}$~~

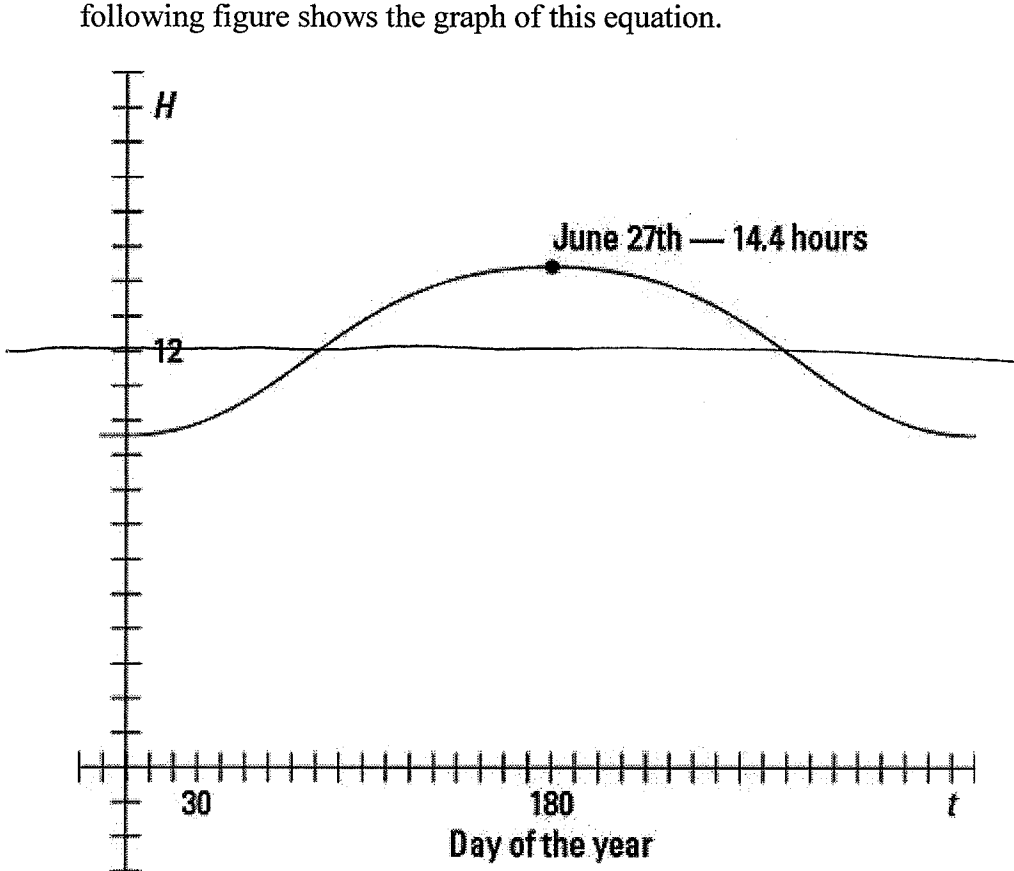
$b = 2$

many possible functions!

Sine function: $y = 1 + 4 \sin 2(x - \frac{\pi}{4})$
 $y = 1 - 4 \sin 2(x - \frac{3\pi}{4})$
 $y = 1 + 4 \sin 2(x - \frac{5\pi}{4})$

Cosine function: $y = 1 - 4 \cos 2x$
 $y = 1 + 4 \cos 2(x - \frac{\pi}{2})$

8. San Diego, California, is a gorgeous part of the world. Whether it's summer or winter, you want to be there. But what if you're someone who likes long, sunny days? When is the best time to go there? Assume that the following formula gives you the number of hours of daylight in San Diego when you input any day of the year. Letting t be the day of the year (from 1 to 365), you can figure the number of hours of sunlight, H , if you enter a value for t in the equation $H(t) = 2.4 \sin(0.017t - 1.377) + 12$. The following figure shows the graph of this equation.



↑
sinusoidal
axis

a) What is the average number of hours of daylight throughout the year in San Diego?

sinusoidal axis

12 hours

b) What is the minimum amount of daylight hours? What is the maximum amount of daylight hours?

$$\text{min} = \text{sinusoidal} - \text{amp}$$

$$12 - 2.4 = \boxed{9.6 \text{ hours}}$$

$$\text{max} = \text{sinusoidal} + \text{amp}$$

$$12 + 2.4 = \boxed{14.4 \text{ hours}}$$

c) What is the period of the function?

$$\frac{2\pi}{.017} = \boxed{\text{approximately } 370 \text{ days}}$$

d) How many hours of daylight occur on Day 350?

$$2.4 \sin(0.017(350) - 1.377) + 12 = \boxed{9.6 \text{ hours}}$$