1 What is $24°$ in radians?

a $\dfrac{\pi}{15} \approx 0.209$

b $\dfrac{1}{15} \approx 0.067$

c $\dfrac{2}{15} \approx 0.133$

d $\dfrac{2\pi}{15} \approx 0.419$

2 What is $9\pi/10$ in degrees?

a $0.005°$

b $162°$

c $324°$

d $0.9°$

3 What is the exact value of $\cos(3\pi/4)$?

a $\dfrac{\sqrt{2}}{2}$

b $\dfrac{\sqrt{3}}{2}$

c $-\dfrac{\sqrt{2}}{2}$

d $-\dfrac{\sqrt{3}}{2}$

4 What is the exact value of $\sec(\pi/3)$?

a 2

b $\dfrac{2\sqrt{3}}{3}$

c $\dfrac{\sqrt{3}}{2}$

d $\dfrac{1}{2}$

5 What is the exact value of $\cot(-90°)$?

a 1

b -1

c undefined

d 0

6 What are the amplitude and period of the function
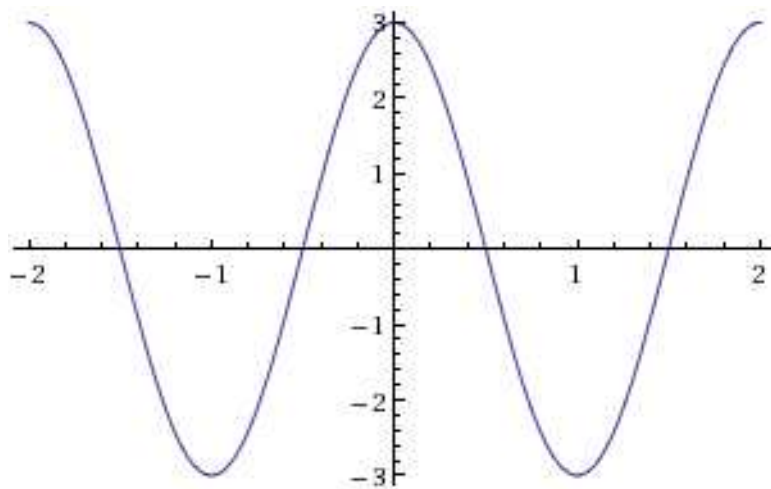
$$f(x) = -\frac{1}{2}\sin{(2x)}?$$

a The amplitude is $-\frac{1}{2}$, and the period is 2.

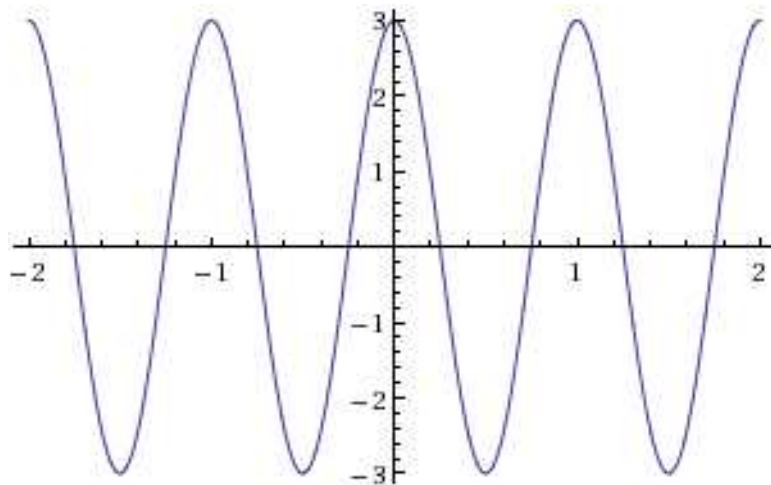*b* The amplitude is 2, and the period is $\frac{1}{2}$.

c The amplitude is $\frac{1}{2}$, and the period is π.

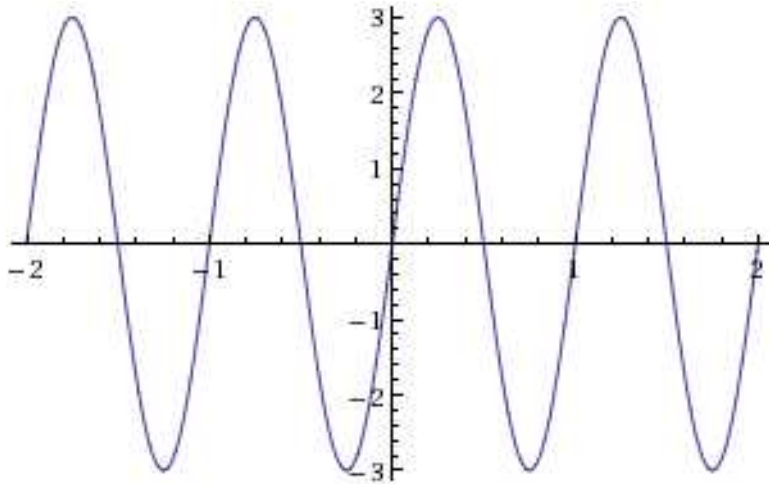*d* The amplitude is 2π, and the period is 2.

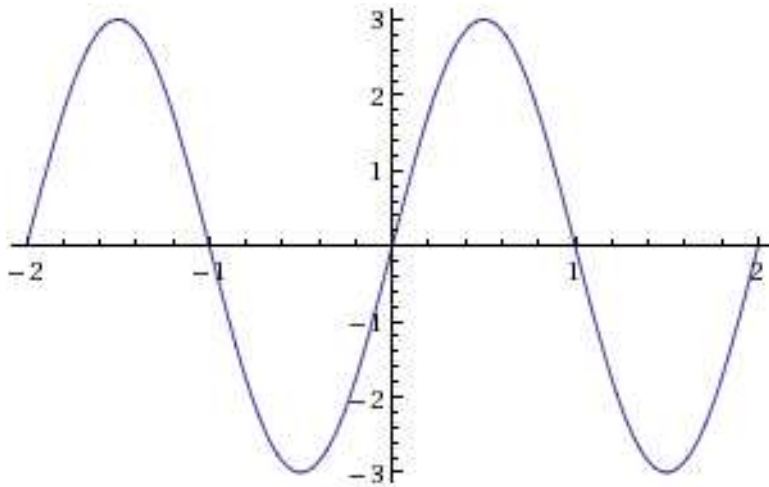**7** What is the graph of the function $f(x) = 3\cos{(\pi x)}$?

a

b

c

d

8 What is $\operatorname{arccot}\left(-\sqrt{3}\right) = \cot^{-1}\left(-\sqrt{3}\right)$?

a $-\dfrac{\pi}{6}$

b $\dfrac{5\pi}{6}$

c $\dfrac{\pi}{6}$

d $\dfrac{\pi}{3}$

9 What is the exact value of $\cos 105°$?

a $-\dfrac{\sqrt{2}+\sqrt{6}}{4} = \dfrac{-\sqrt{2}-\sqrt{6}}{4} = \dfrac{\sqrt{2+\sqrt{3}}}{2}$

b $\dfrac{\sqrt{2}-\sqrt{6}}{4} = -\dfrac{\sqrt{2-\sqrt{3}}}{2}$

c $\dfrac{\sqrt{6}-\sqrt{2}}{4} = \dfrac{\sqrt{2-\sqrt{3}}}{2}$

d $\dfrac{\sqrt{2}+\sqrt{6}}{4} = \dfrac{\sqrt{2+\sqrt{3}}}{2}$

10   Solve the equation $2\cos\theta + 1 = 2$ for $0 \le \theta < 2\pi$.

a $\theta = \dfrac{\pi}{3}, \dfrac{2\pi}{3}$

b $\theta = \dfrac{\pi}{3}, \dfrac{4\pi}{3}$

c $\theta = \dfrac{\pi}{3}$

d $\theta = \dfrac{\pi}{3}, \dfrac{5\pi}{3}$

11   A triangle has a side of length 3 and a side of length 4. The angle between these two sides has measure $40°$. To solve this triangle, which other quantity should you calculate first?

a the measure of the angle opposite the side of length 4

b the measure of the angle opposite the side of length 3

c either of the above (it makes no difference)

d the length of the side opposite the angle of measure $40°$

12   **Extra credit:** Solve the triangle in the previous exercise completely. (Show what equations you solve or what numerical calculations you make.)

13   A triangle has a side of length 5, and the angle opposite this side has measure $50°$. Another side has length 2. How many triangles (up to congruence) meet this description?

a none

b one

c two

d three

14   Write $(x,y) = (-4,4)$ in polar coordinates, using $r \ge 0$ and $0 \le \theta < 2\pi$.

a $(r,\theta) = \left(4, \dfrac{5\pi}{4}\right)$

b $(r,\theta) = \left(-4\sqrt{2}, \dfrac{\pi}{4}\right)$

c $(r,\theta) = \left(4\sqrt{2}, \dfrac{3\pi}{4}\right)$

d $(r,\theta) = \left(2\sqrt{2}, \dfrac{7\pi}{4}\right)$

15   Write $(r,\theta) = (2, \pi/2)$ in rectangular coordinates.

a $(x,y) = (2,0)$

b $(x,y) = (0,-2)$

c $(x,y) = (-2,0)$

d $(x,y) = (0,2)$

Answers

1 D, 2 B, 3 C, 4 A, 5 D, 6 C, 7 A, 8 B, 9 D, 10 D, 11 D, 13 B, 14 C, 15 D

12 Given $a = 3$, $b = 4$, and $C = 40°$,

$$c = \sqrt{(3)^2 - 2(3)(4)\cos(40°) + (4)^2} = \sqrt{25 - 24\cos 40°} \approx 2.57.$$

Then

$$A = \arccos \frac{(4)^2 + (\sqrt{25 - 24\cos 40°})^2 - (3)^2}{2(4)(\sqrt{25 - 24\cos 40°})} = \arccos \frac{4 - 3\cos 40°}{\sqrt{25 - 24\cos 40°}} \approx 48.6°,$$

and

$$B = \arccos \frac{(3)^2 + (\sqrt{25 - 24\cos 40°})^2 - (4)^2}{2(3)(\sqrt{25 - 24\cos 40°})} = \arccos \frac{3 - 4\cos 40°}{\sqrt{25 - 24\cos 40°}} \approx 91.4°.$$