Problems

Graph the following trigonometric functions over $[-P, P]$ where P is the period of the function. Determine the period, phase shift and amplitude.

1. $f(x) = -\cos\left(x + \dfrac{\pi}{4}\right) - 2$.

2. $y = \dfrac{1}{2}\sin\left(\dfrac{\pi x}{2} - \pi^2\right)$.

3. $G(t) = -2\sin\left(\pi t + \pi\right) + \dfrac{1}{2}$.

4. $y = \pi\cos\left(\dfrac{2x}{3} + \dfrac{\pi}{6}\right)$.

5. $y = \pi\sin\left(\dfrac{t}{\sqrt{\pi}} - \dfrac{\sqrt{\pi}}{2}\right) - \dfrac{\pi}{2}$.

Answers

1. period 2π; phase shift $-\pi/4$; amplitude 1.
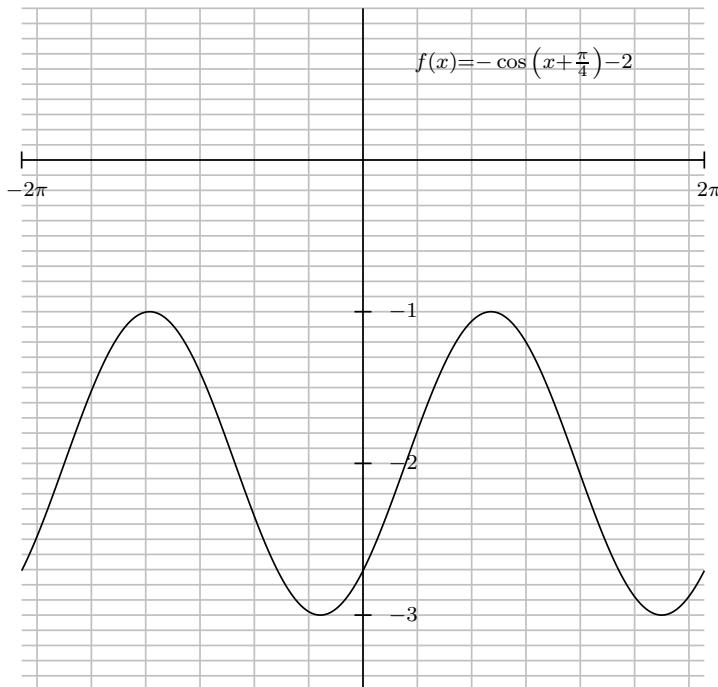
$f(x) = -\cos\left(x + \frac{\pi}{4}\right) - 2$

PSfrag replacements

2. period 4; phase shift 2π; amplitude $1/2$.

$$y = \tfrac{1}{2}\sin\left(\tfrac{\pi x}{2} - \pi^2\right)$$

1/2

−4

4

−1/2

PSfrag replacements
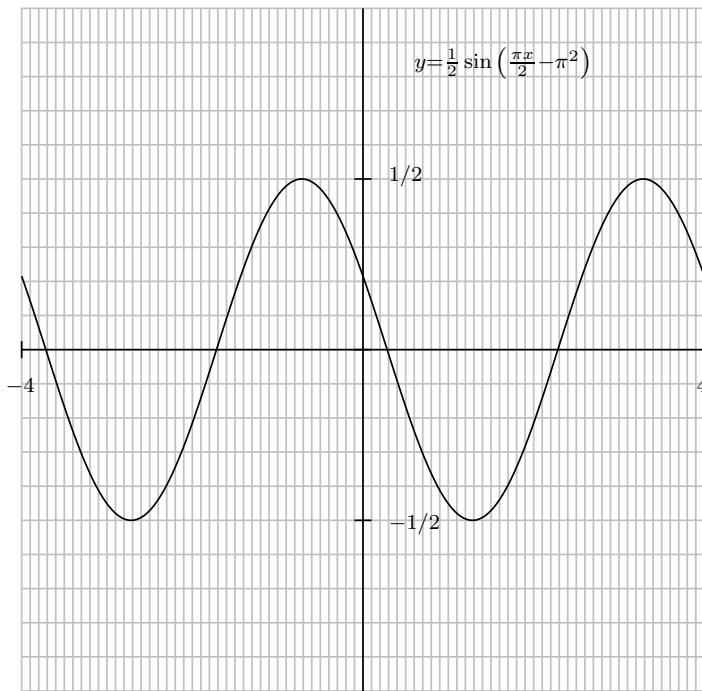
3. period 2; phase shift -1; amplitude 2.
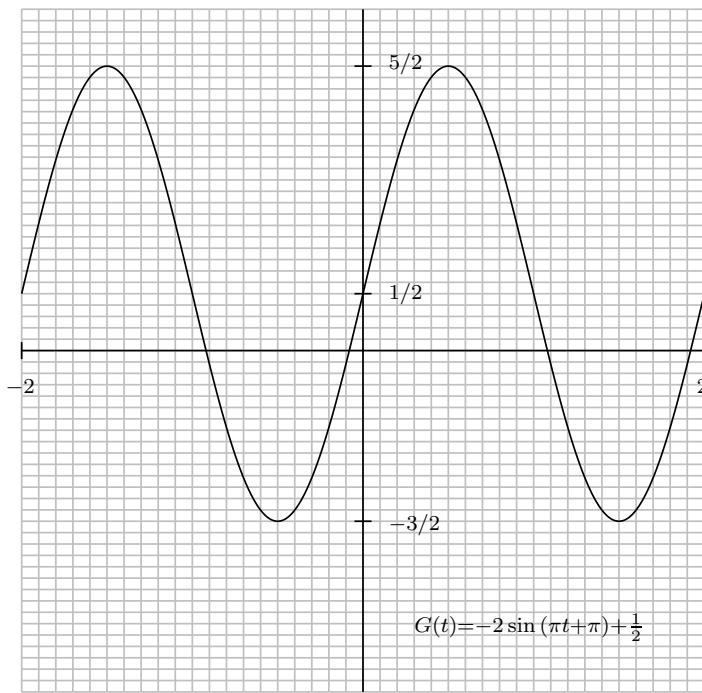
5/2

1/2

−2

2

−3/2

PSfrag replacements

$$G(t) = -2\sin\left(\pi t + \pi\right) + \tfrac{1}{2}$$

4. period 3π; phase shift $-\pi/4$; amplitude π.

$y = \pi \cos\left(\frac{2x}{3} + \frac{\pi}{6}\right)$

π

-3π 3π

PSfrag replacements

$-\pi$
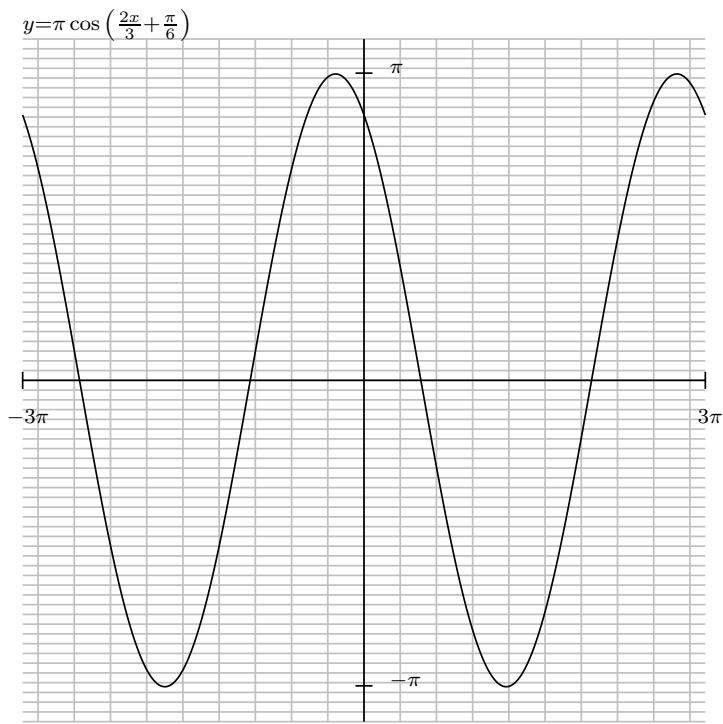
5. period $2\pi^{3/2}$; phase shift $\pi/2$; amplitude π.

$y = \pi \sin\left(\frac{t}{\sqrt{\pi}} - \frac{\sqrt{\pi}}{2}\right) - \frac{\pi}{2}$

$\pi/2$

$-2\pi^{3/2}$ $2\pi^{3/2}$

PSfrag replacements

$-3\pi/2$