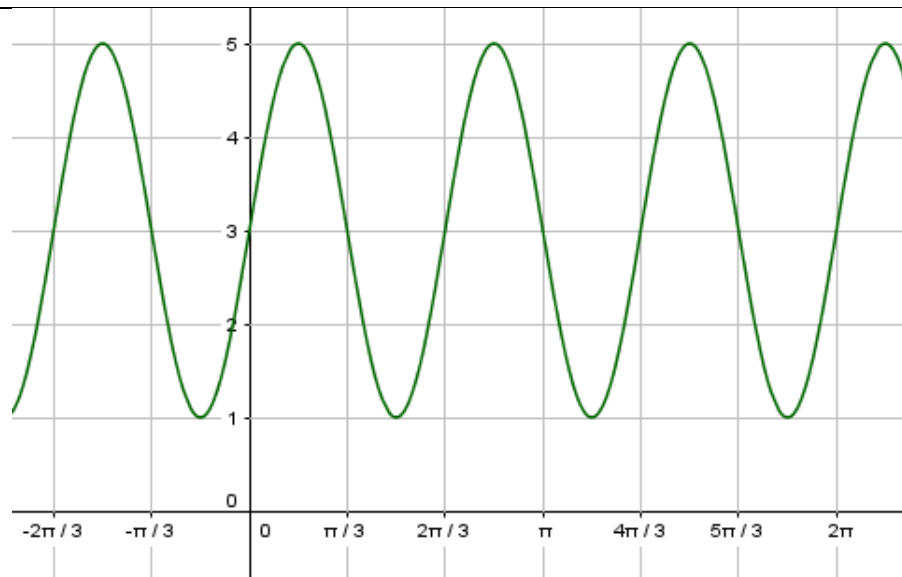


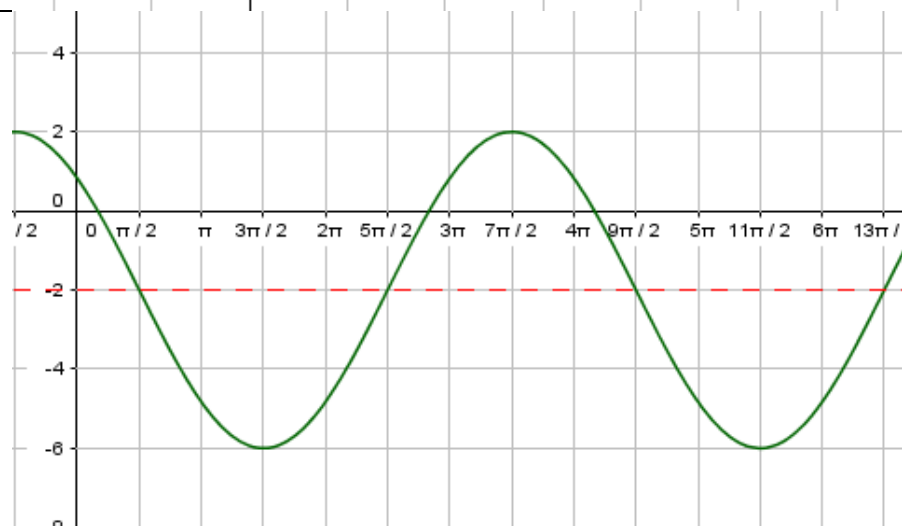
Graph $f(x)$ and find the range, amplitude, phase shift, period and neutral line.

1. $f(x) = -2\sin(3x - \pi) + 3$



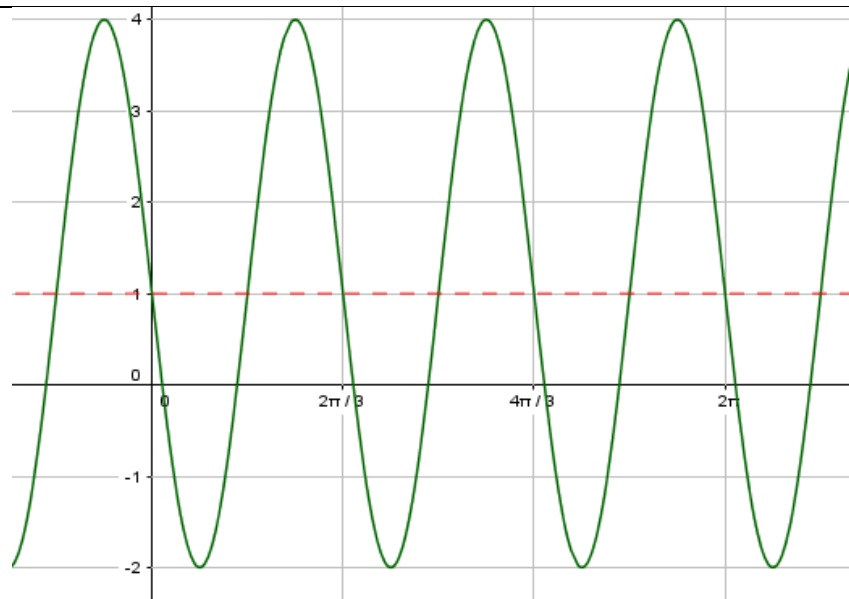
range: $[1, 5]$
 amplitude: 2
 phase shift: $\frac{\pi}{3}$
 period: $\frac{2\pi}{3}$
 neutral line: $y = 3$

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



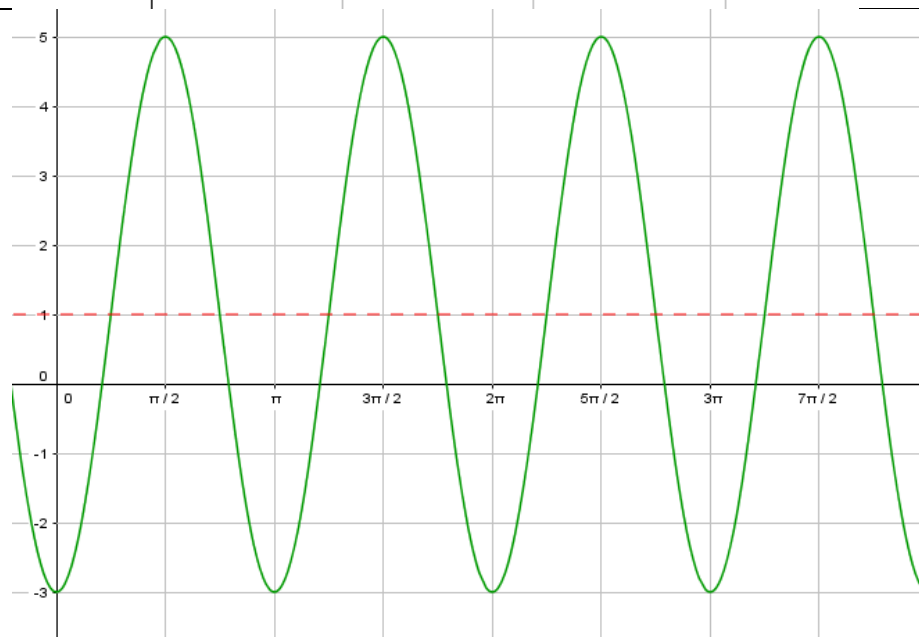
range: $[-6, 2]$
 amplitude: 4
 phase shift: $-\frac{\pi}{2}$
 period: 4π
 neutral line: $y = -2$

3. $f(x) = -3\sin(3x - 2\pi) + 1$



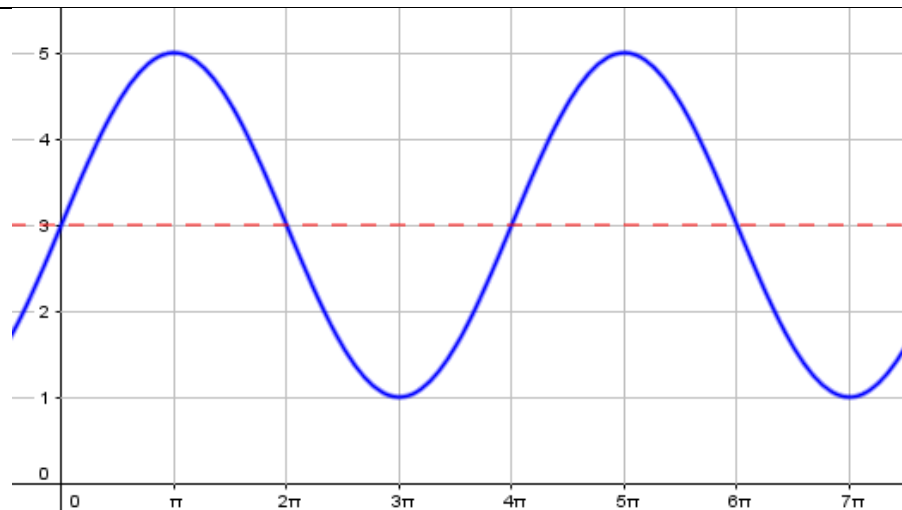
range: $[-2, 4]$
 amplitude: 3
 phase shift: $\frac{2\pi}{3}$
 period: $\frac{2\pi}{3}$
 neutral line: $y = 1$

4. $f(x) = 4\cos(2x - 3\pi) + 1$



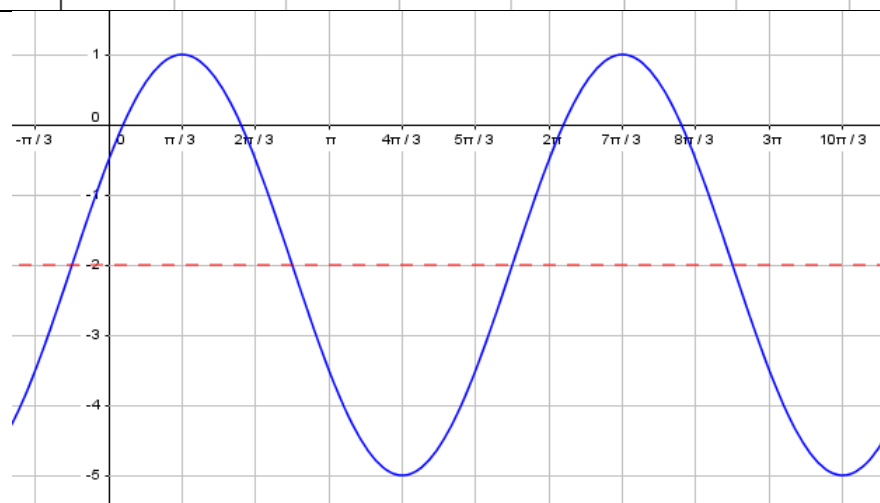
range: $[-3, 5]$
 amplitude: 4
 phase shift: $\frac{3\pi}{2}$
 period: π
 neutral line: $y = 1$

5. $f(x) = -2\sin\left(\frac{x}{2} - \pi\right) + 3$



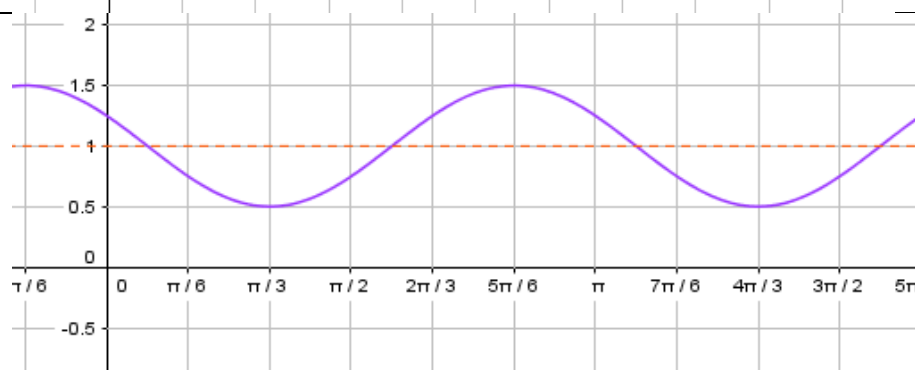
range: $[1, 5]$
 amplitude: 2
 phase shift: 2π
 period: 4π
 neutral line: $y = 3$

6. $f(x) = 3\cos\left(x - \frac{\pi}{3}\right) - 2$



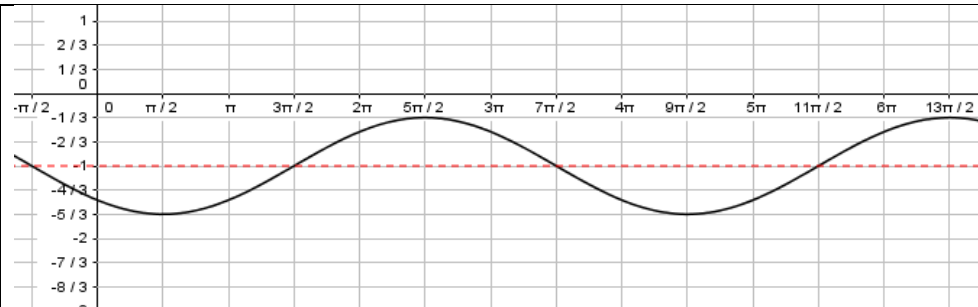
range: $[1, -5]$
 amplitude: 3
 phase shift: $\frac{\pi}{3}$
 period: 2π
 neutral line: $y = -2$

7. $f(x) = \frac{1}{2}\cos\left(2x + \frac{\pi}{3}\right) + 1$



range: $\left[\frac{1}{2}, \frac{3}{2}\right]$
 amplitude: $\frac{1}{2}$
 phase shift: $-\frac{\pi}{6}$
 period: π
 neutral line: $y = 1$

8. $f(x) = -\frac{2}{3}\sin\left(\frac{x}{2} + \frac{\pi}{4}\right) - 1$



range: $\left[-\frac{5}{3}, -\frac{1}{3}\right]$
 amplitude: $\frac{2}{3}$
 phase shift: $-\frac{\pi}{2}$
 period: 2π
 neutral line: $y = -1$