

1. Identify the amplitude, frequency, wavelength, and phase of the following sine waves:

(a) $2 \sin\left(3x + \frac{\pi}{3}\right)$

(b) $\frac{\sin\left(\frac{x}{2}\right)}{2}$

(c) $\cos(4x)$

(d) $\sin\left(3\left(x - \frac{\pi}{4}\right)\right)$

2. Compute the following:

(a) $\frac{d}{dx} \cos(3x)$

(b) $\int 4 \cos\left(\frac{x}{2}\right) dx$

(c) $\int_0^{\frac{\pi}{4}} \sin(4x) dx$

(d) $\int_{\frac{3\pi}{2}}^{2\pi} \sin(2x) dx$

3. Compute the following derivatives using the product rule:

(a) $x^2 \cdot x^3$

(b) $2xe^{3x} - x^2 \sin(3x)$

(c) $e^x \sin(2x)$

(d) $x^2 e^{2x} \sin(2x)$