Sections 4.5 – I.C.E. – Translations of Sine & Cosine

Translations of Sine and Cosine

If we have the constant c in the general equations,

$y = A \sin B(x - C) + D$ and $y = A \cos B(x - C) + D$

then these equations have the following characteristics: **amplitude = |a|**

period = $\frac{2\pi}{B}$ **.**

1. If C > 0 there is a horizontal shift C units to the right and if C < 0 there is a horizontal shift C units to the left.
2. If D > 0 the shift is d units upward and if D < 0 the shift is d units downward.
3. If A < 0 ➔ reflection across x–axis.
4. If B < 0 ➔ reflection across y-axis.

1) Find the amplitude, frequency, and period of the following equations:

a) $y = -4\sin\frac{x}{6}$

amplitude = _____

frequency = _____

period = _____

b) $y = 9\cos 5\left(x + \frac{7\pi}{8}\right)$

amplitude = _____

frequency = _____

period = _____

c) $y = 2\sin 4x - 5$

amplitude = _____

frequency = _____

period = _____

d) $y = -\frac{1}{3}\cos\frac{1}{3}x - \frac{1}{3}$

amplitude = _____

frequency = _____

period = _____

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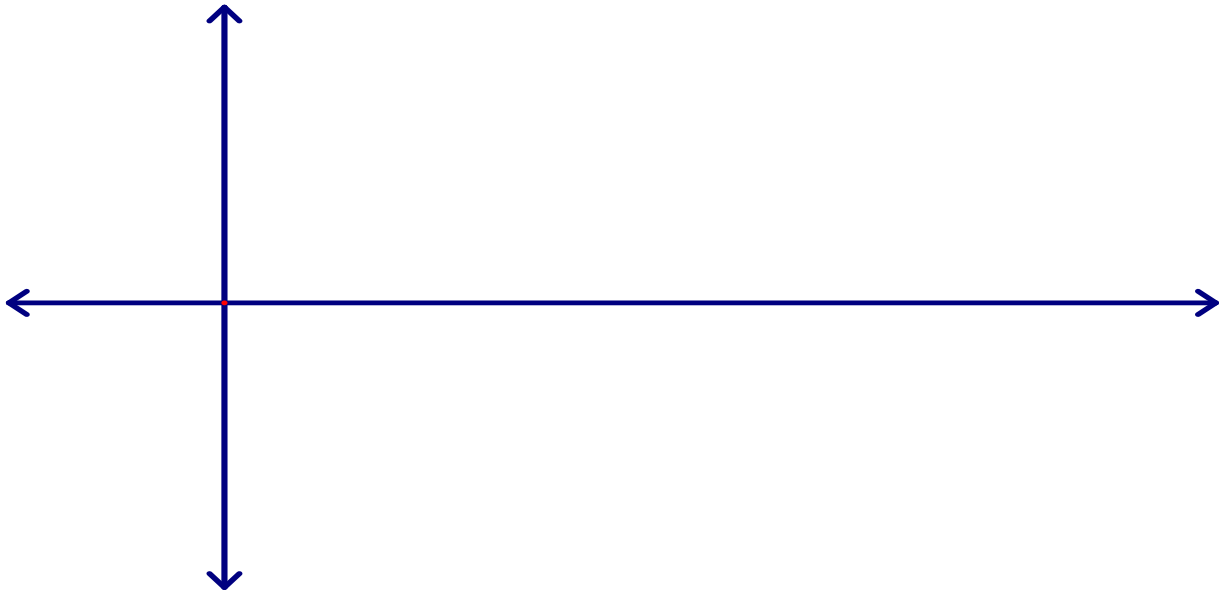
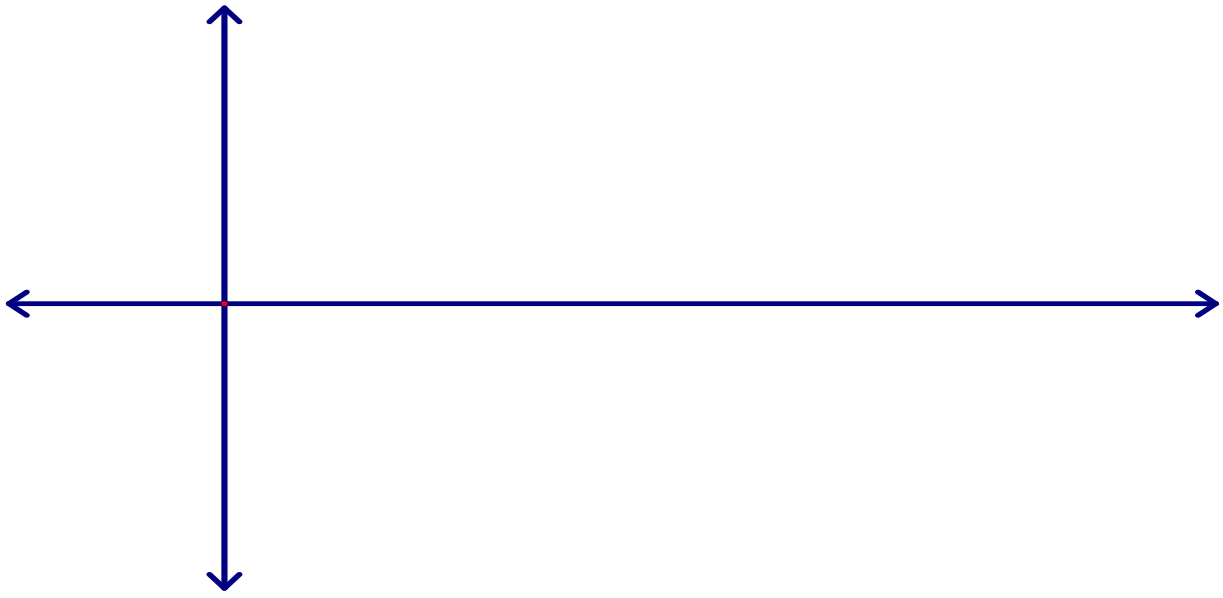
Sketch graphs of the following (graph either at least one period, or from 0 to 2π):

2) $y = \frac{1}{2}\sin\left(x - \frac{\pi}{3}\right)$



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



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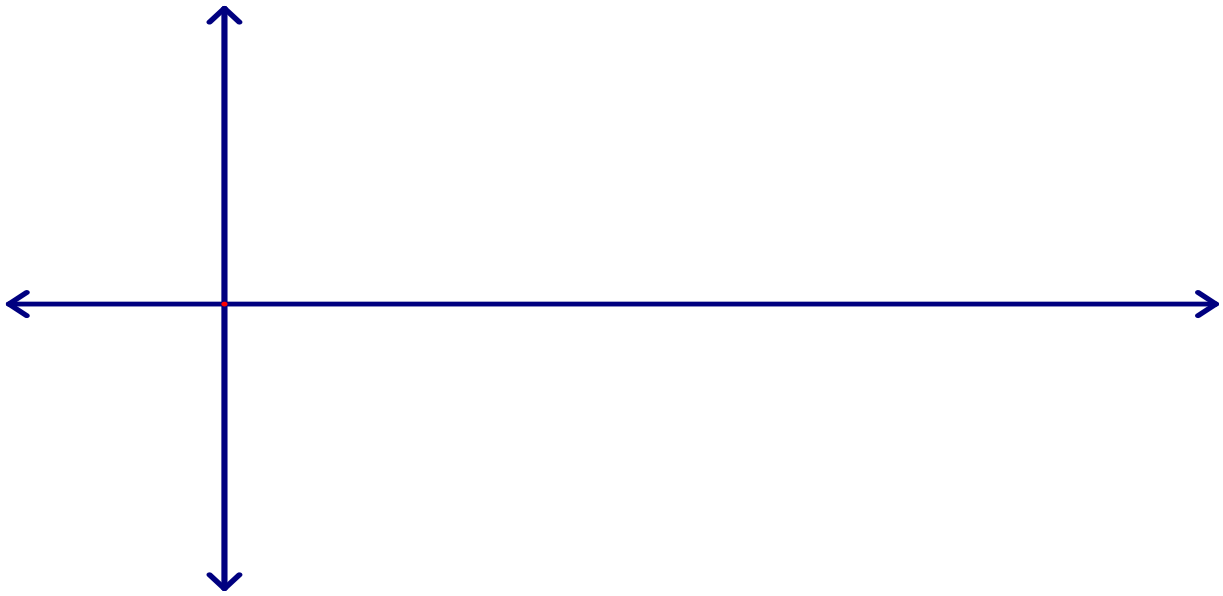
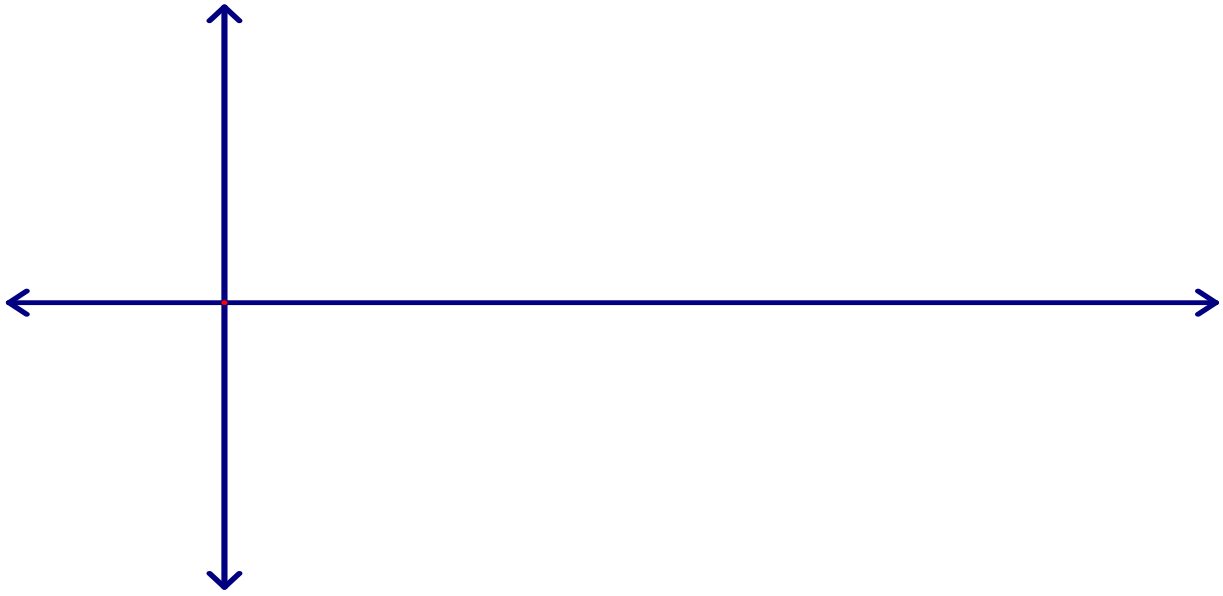
4) $y = 3\cos\frac{1}{2}x + 2$



5) $y = -2\sin x - 2$



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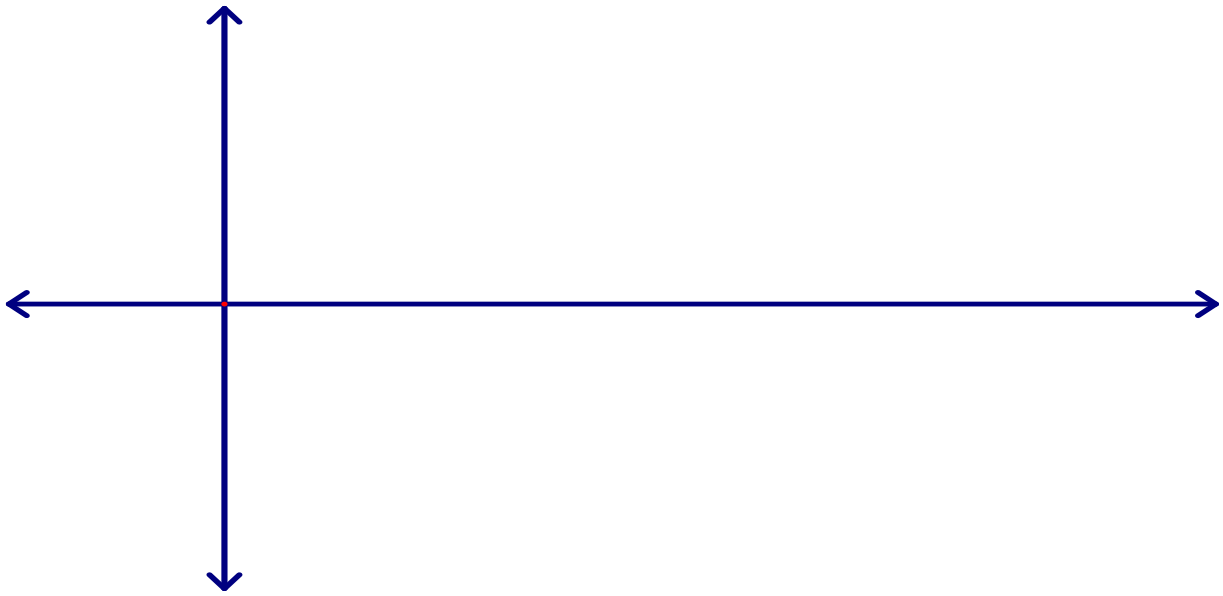
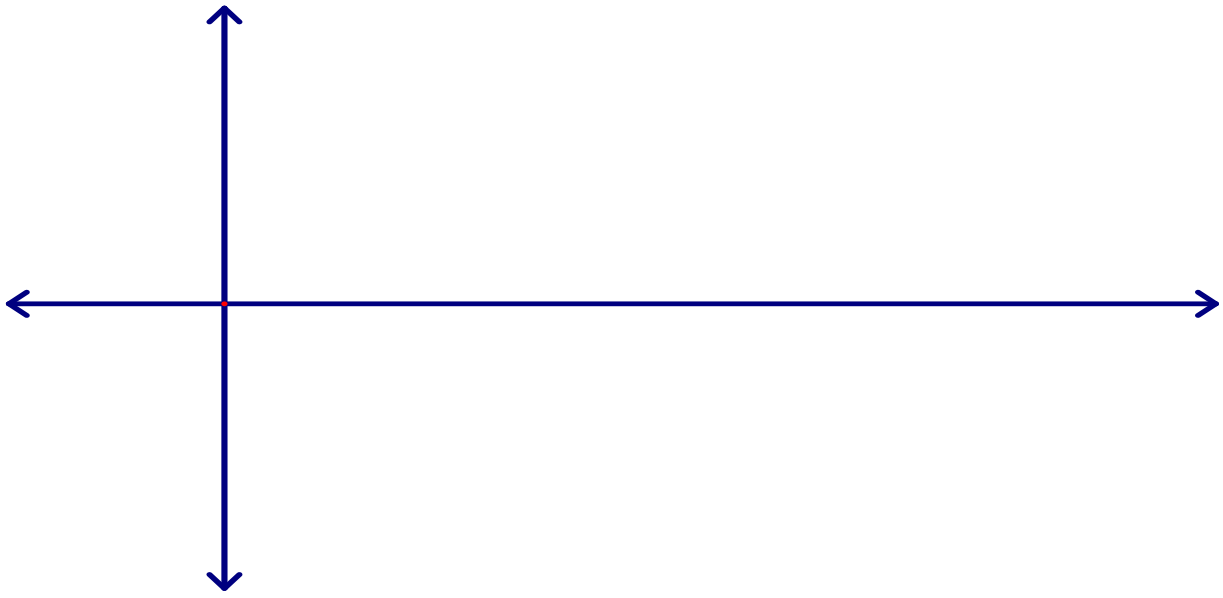
6) $y = -\frac{2}{3}\cos 3x - 1$



7) $y = \sin 4\left(x - \pi\right) + 3$



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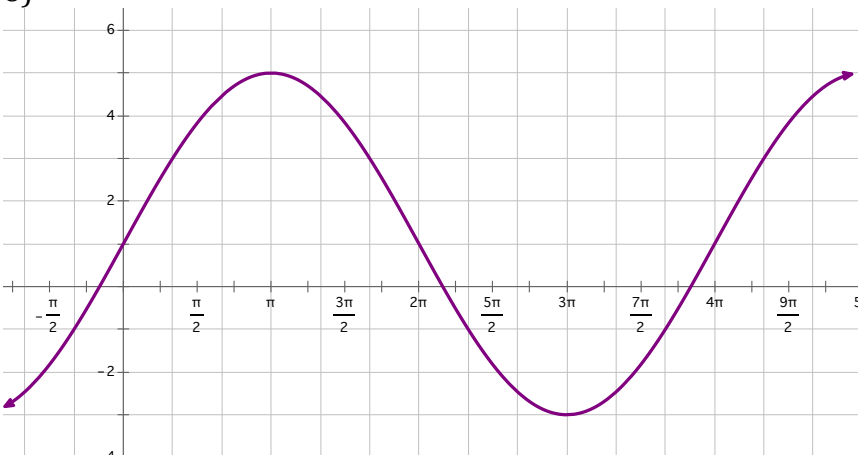
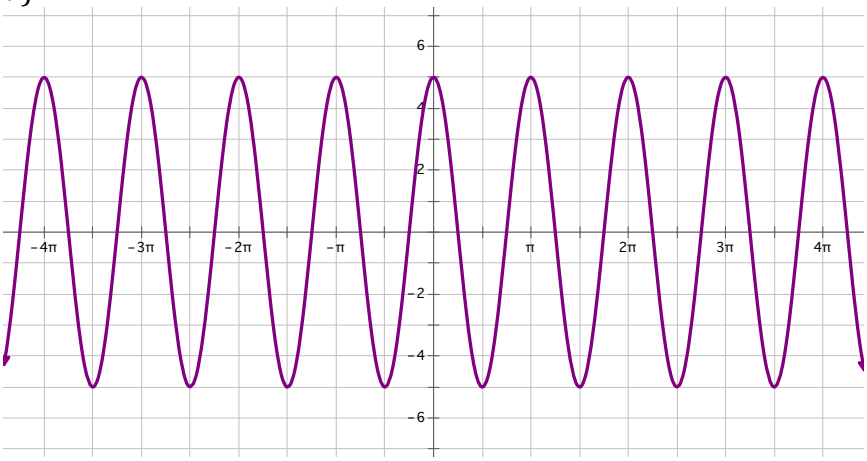
Identify an equation (sine or cosine) for the following graphs:

8)



9)



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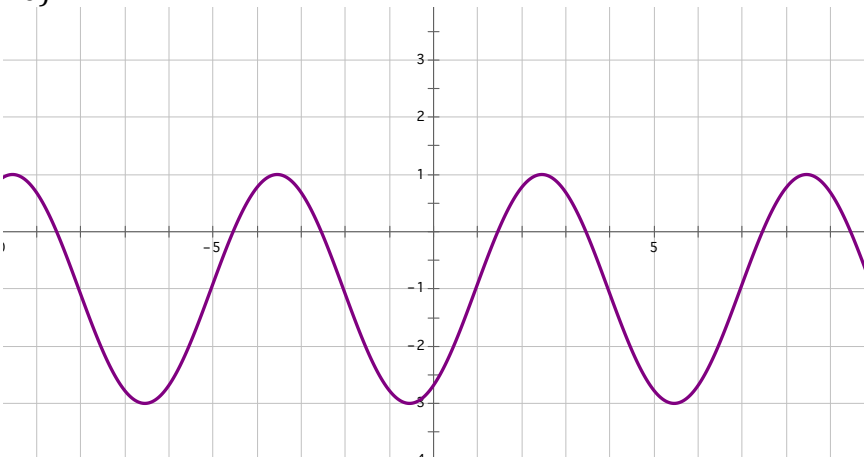
10)



11)