Name:_____

SM3 10.1: Graphing Sine & Cosine

Vocabulary: amplitude, period, midline, phase shift, vertical shift, frequency

Problems:

Identify the amplitude and period for each problem.

1) $f(x) = \sin(4x)$

2) $y = 2\cos(x)$

3) $g(x) = 4\sin(3x)$

4) $h(x) = \cos(.5x + 2)$

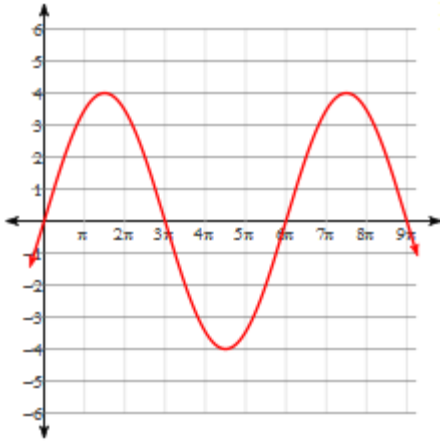
5) $y = 4 + \sin\left(\frac{3}{2}x\right)$

6) $f(x) = -2 + \cos(2x + 6)$

7) $f(x) = \frac{1}{2}\cos(x - 2) + 1$

8) $g(x) = -3\sin(-x)$

9)



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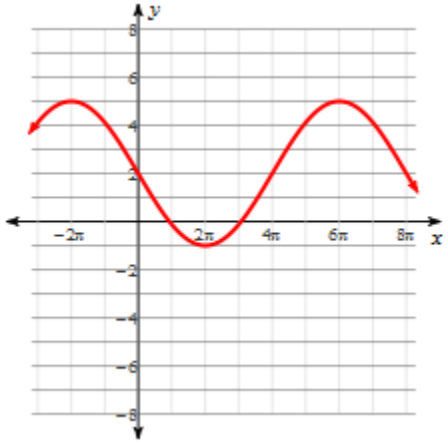

Describe how changes in the given variable change the shape of the curve of $y = \sin x$:

$$y = a\sin\big(b(x - h)\big) + k$$

11) $k = 2$

13) $a = 2$

15) $b = 2$

17) $h = -\pi$

12) $k = \frac{1}{3}$

14) $a = \frac{1}{3}$

16) $b = \frac{1}{3}$

18) $h = \frac{\pi}{3}$

Sketch an appropriate coordinate axis and graph two periods of the function.

19) $y = 3\sin x$

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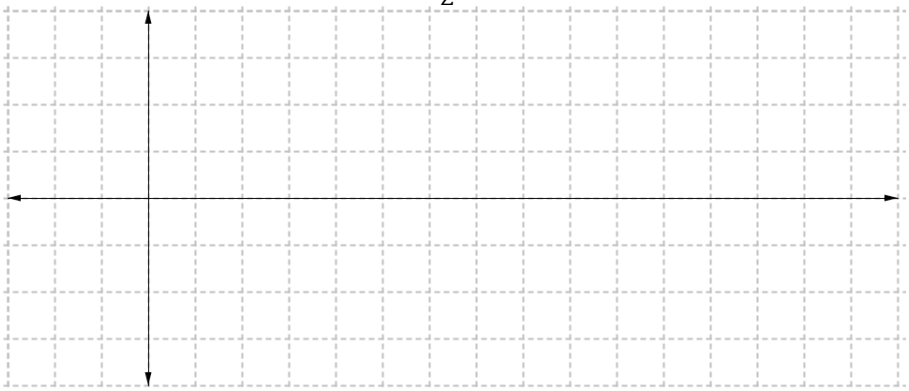
20) $y = \frac{1}{2}\cos x$



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21) $f(x) = -4\sin x$

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22) $g(x) = \sin\left(\frac{x}{4}\right)$

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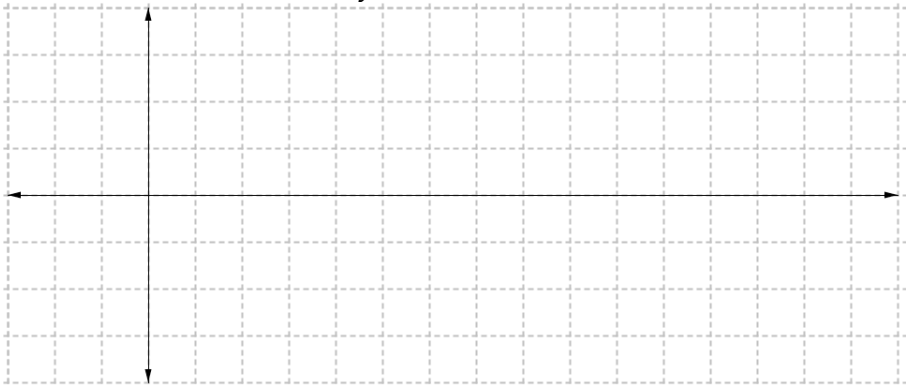
23) $y = 1 + 2\cos x$



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24) $f(x) = -2 + 3\sin x$

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25) $h(x) = \sin\left(x - \frac{\pi}{2}\right)$

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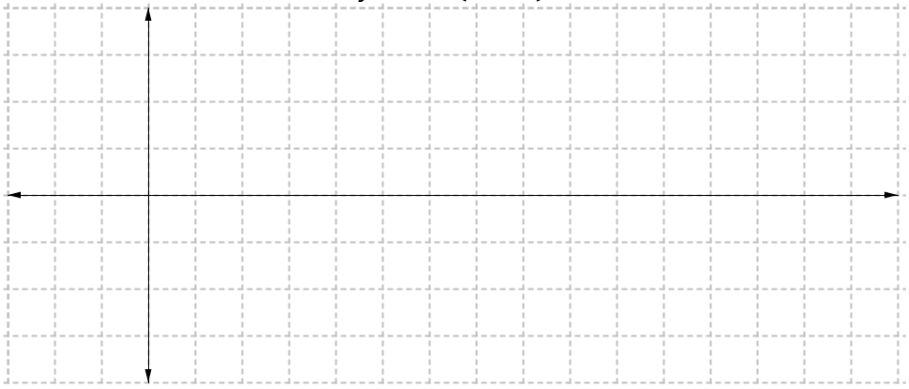
26) $y = \cos(x + \pi)$



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27) $g(x) = \sin(2x - \pi)$

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28) $f(x) = \cos\left(3x + \frac{\pi}{4}\right)$

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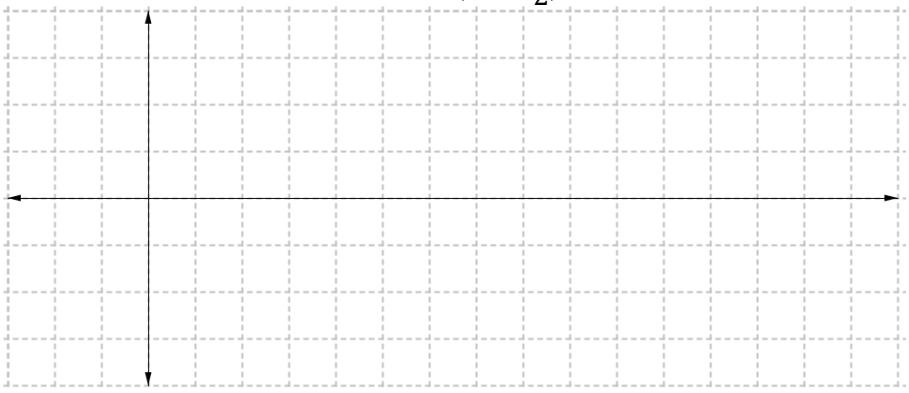
29) $f(x) = 3\sin\left(2x - \frac{\pi}{2}\right) - 2$



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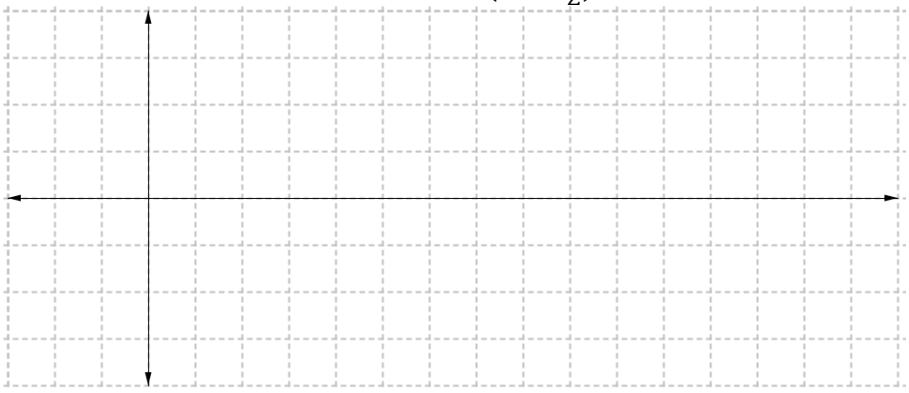
30) $y = 1 + 2\cos\left(3x - \frac{\pi}{2}\right)$



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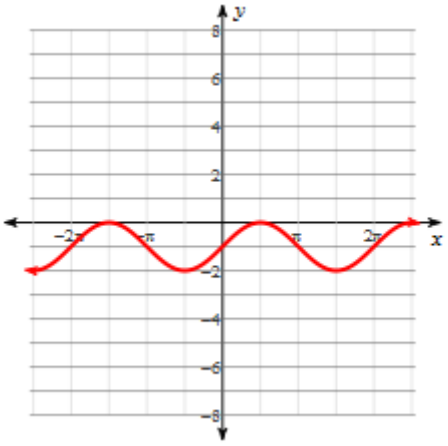
For 31-32, write the simplest form of a) the sine function and b) the cosine function for the graphs shown below.

31)



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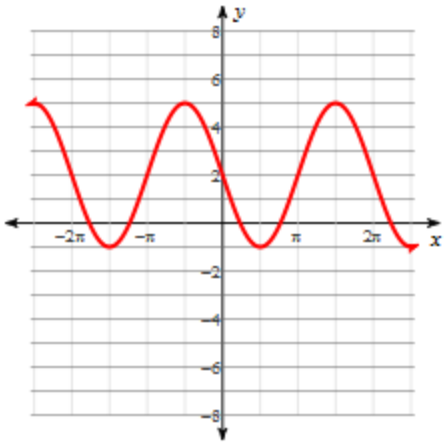

33) The frequency of a sound wave is 750 cycles per second. If the sound intensity can be modeled by the sine function $S(t) = 0.05\sin(750t)$, what is the period of the sound wave?

34) The voltage in an alternating current circuit can be modeled by the function $V(t) = 175\sin(110\pi t)$. How many times does the voltage reach a peak positive or negative value in 1 second?

35) The alarm in a smoke detector produces a high-pitched sound when smoke is detected. The intensity of the sound can be modeled by the function $I(t) = \cos(3 \cdot 10^4 \cdot \pi \cdot t)$. What are the period and frequency of the sound intensity? The frequency is measured in cycles per second.