

SM3 7.1: Graphing Sine & Cosine

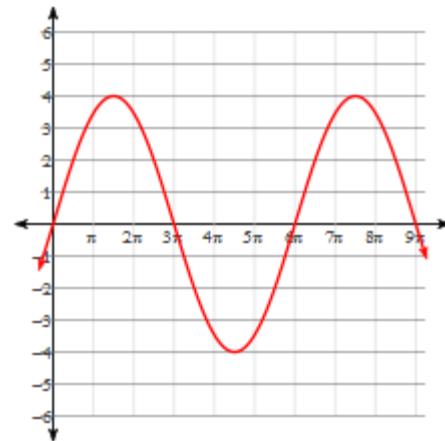
Vocabulary: amplitude, period, midline, phase shift, vertical shift, frequency

Problems:

Identify the amplitude and period for each problem.

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

9)



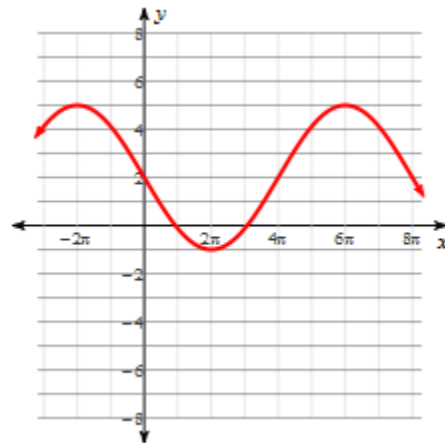
2) $y = 2 \cos(\theta)$

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

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

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

10)



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

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

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

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

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

11) $k = 2$

13) $a = 2$

15) $b = 2$

17) $h = -\pi$

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

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

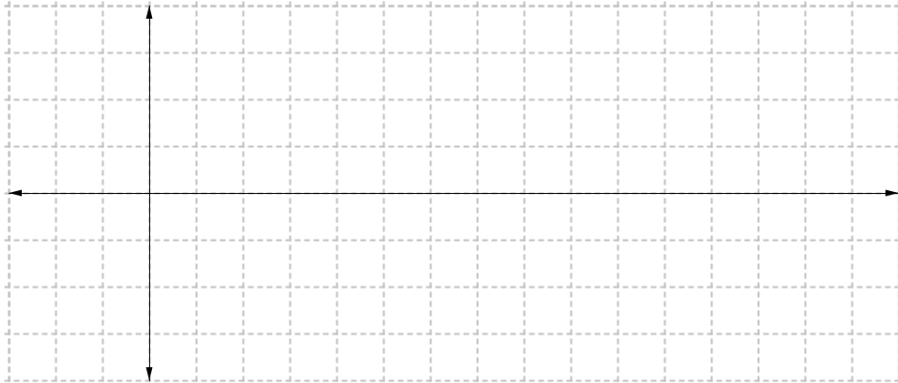
16) $b = \frac{1}{3}$

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

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

19)

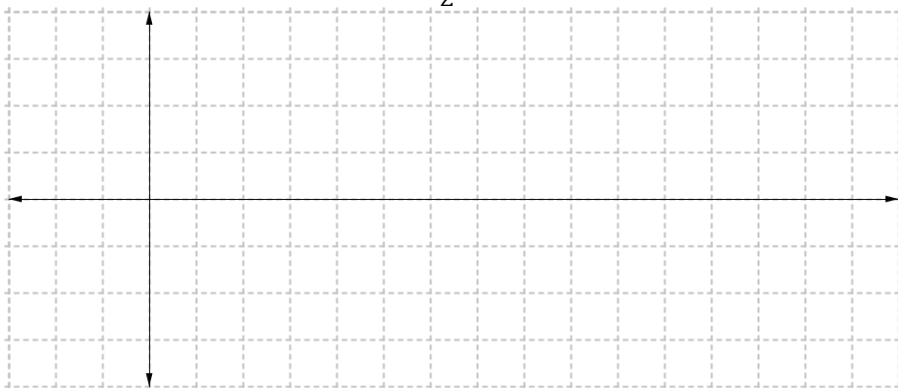
$$y = 3 \sin \theta$$



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20)

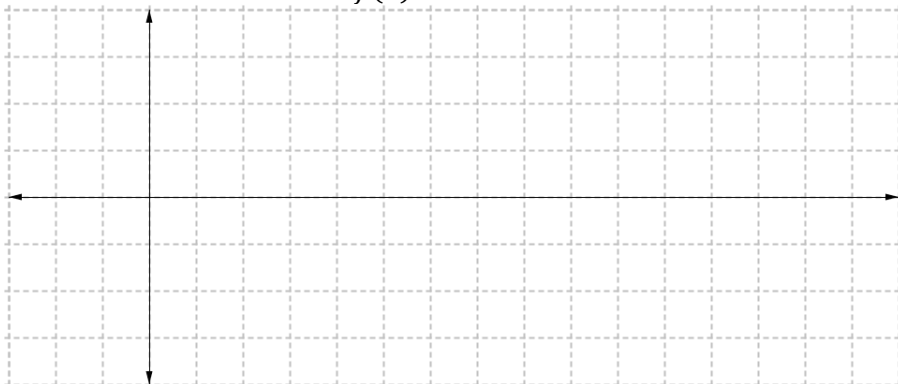
$$y = \frac{1}{2} \cos \theta$$



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21)

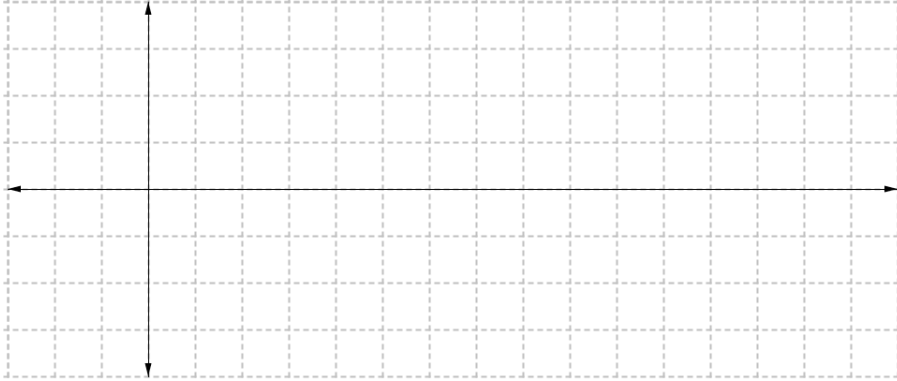
$$f(x) = -4 \sin \theta$$



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22)

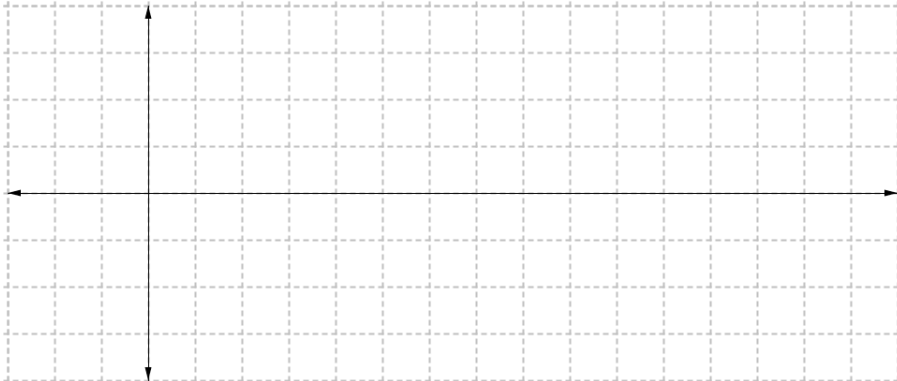
$$g(x) = \sin\left(\frac{\theta}{4}\right)$$



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23)

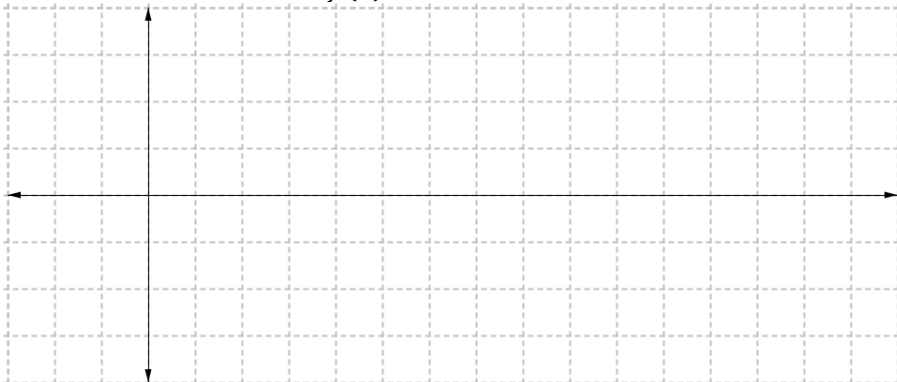
$$y = 1 + 2 \cos \theta$$



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24)

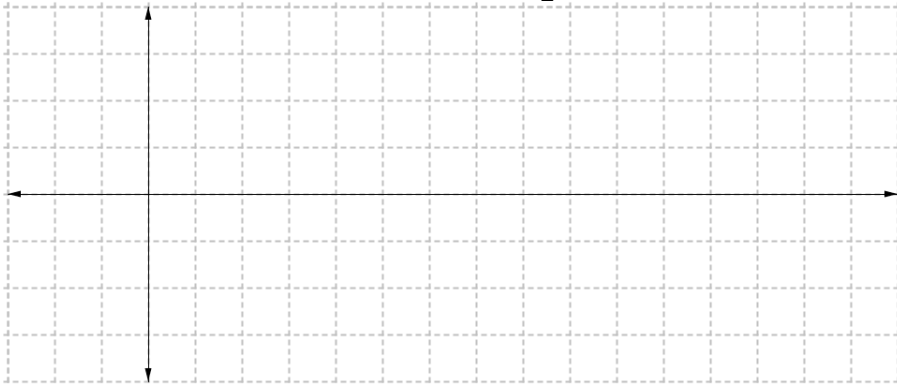
$$f(x) = -2 + 3 \sin \theta$$



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25)

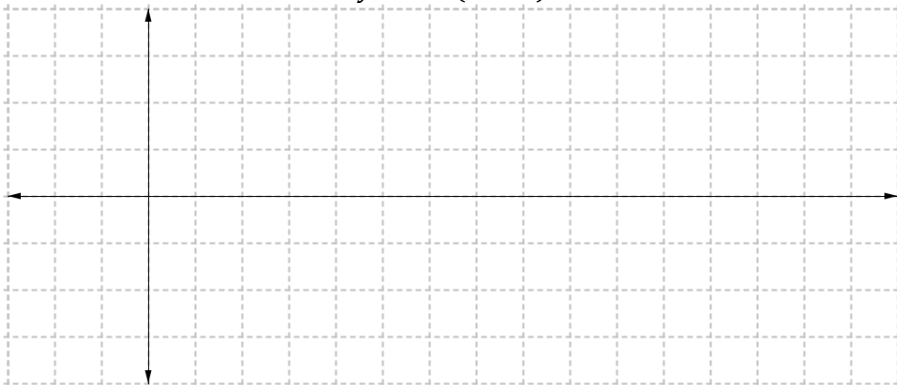
$$h(x) = \sin\left(\theta - \frac{\pi}{2}\right)$$



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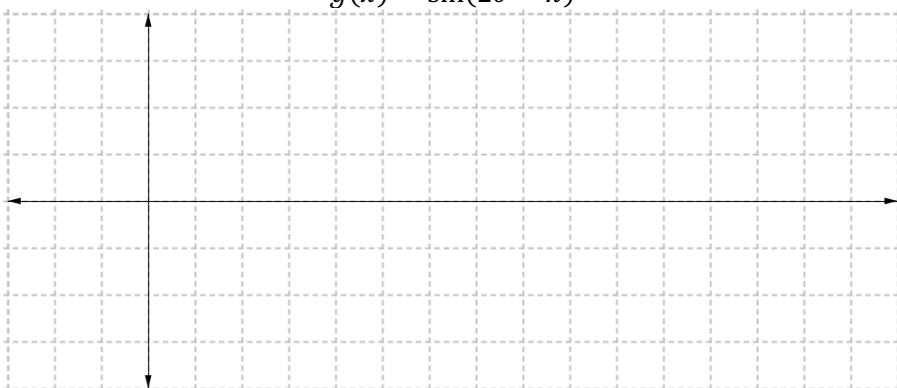
$$y = \cos(\theta + \pi)$$



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27)

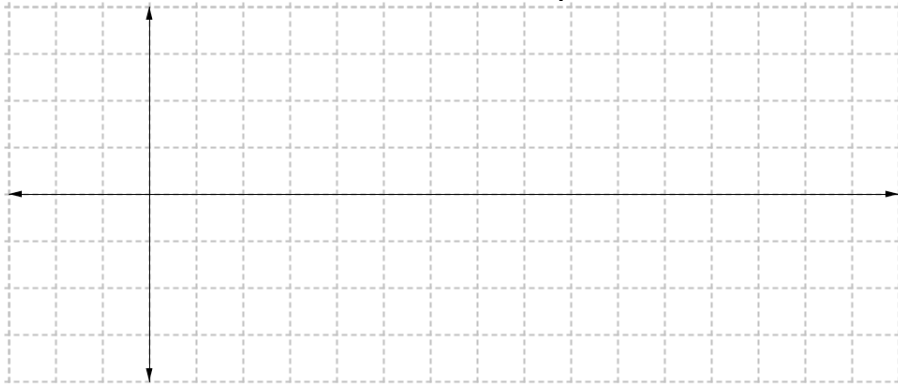
$$g(x) = \sin(2\theta - \pi)$$



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28)

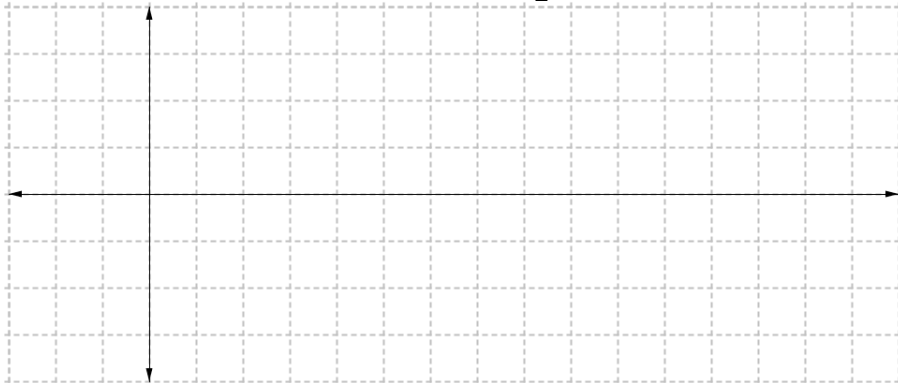
$$f(x) = \cos\left(3\theta + \frac{\pi}{4}\right)$$



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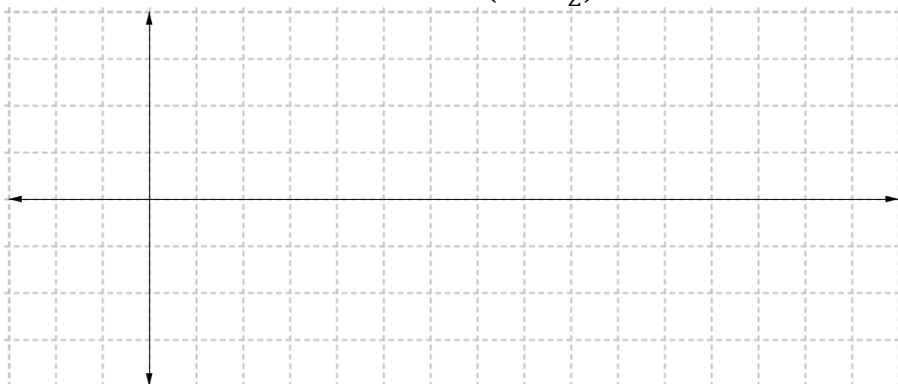
$$f(x) = 3 \sin\left(2\theta - \frac{\pi}{2}\right) - 2$$



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30)

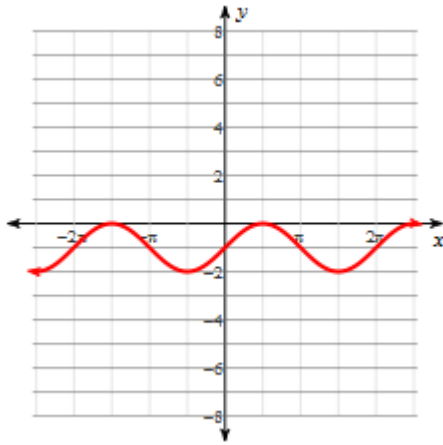
$$y = 1 + 2 \cos\left(3\theta - \frac{\pi}{2}\right)$$



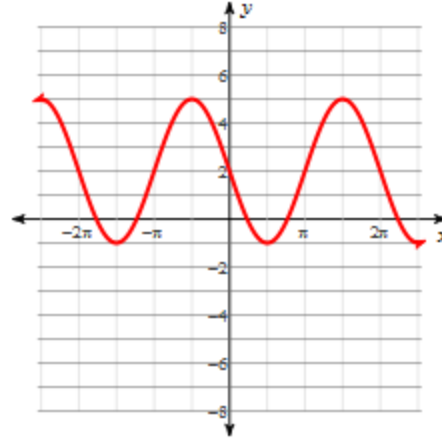
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For 31-32, write the simplest form of a) the sine function and b) the cosine function for the graphs shown below.

31)



32)



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.