10.1 Practice – Graphing Sine and Cosine Name: Solutions

Pre-Calculus

For 1-3, identify the amplitude, period, frequency and vertical shift of each function.

1. $f(\theta) = 13\sin 2\theta - 7$

Amp: 13 Period: $\frac{2\pi}{2} = \pi$

Freq: $\frac{1}{\pi}$ Vert. Shift: down 7

2. $g(t) = 5 - 6\cos(\pi t)$

Amp: 6 Period: $\frac{2\pi}{\pi} = 2$

Freq: $\frac{1}{2}$ Vert. Shift: up 5

3. $h(\theta) = -24\sin(8\pi\theta)$

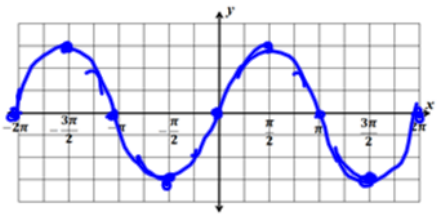
Amp: 24 Period: $\frac{2\pi}{8\pi} = \frac{1}{4}$

Freq: 4 Vert. Shift: 0

For 4-15, identify the given information and graph the trig function.

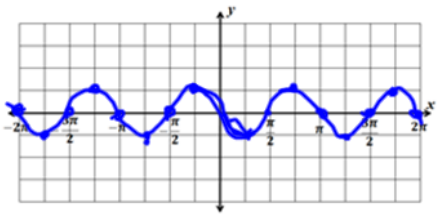
4. $f(\theta) = 3\sin\theta$

Amp: 3 Period: $\frac{2\pi}{1}$ 2π Freq: $\frac{1}{2\pi}$



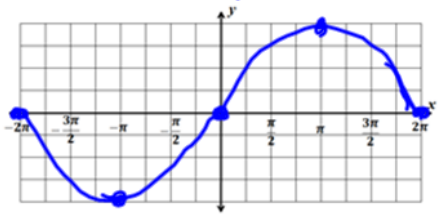
5. $y = -\sin 2x$

Amp: 1 Period: $\frac{2\pi}{2}$ π Freq: $\frac{1}{\pi}$



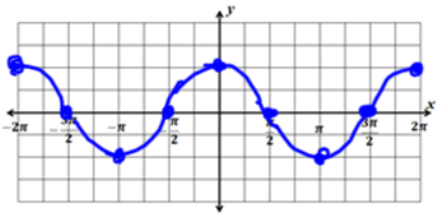
6. $f(\theta) = 4\sin\frac{1}{2}\theta$

Amp: 4 Period: $\frac{2\pi}{\frac{1}{2}}$ 4π Freq: $\frac{1}{4\pi}$



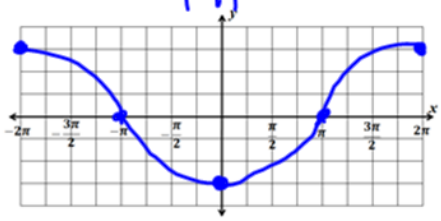
7. $y = 2\cos x$

Amp: 2 Period: 2π Freq: $\frac{1}{2\pi}$



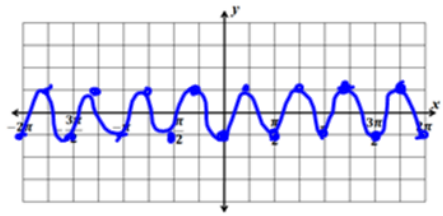
8. $f(\theta) = -3\cos\frac{1}{2}\theta$

Amp: 3 Period: $\frac{2\pi}{\frac{1}{2}}$ 4π Freq: $\frac{1}{4\pi}$



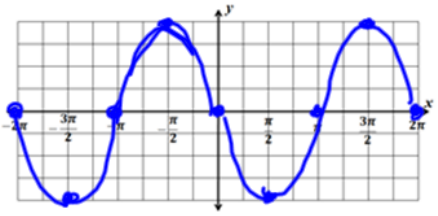
9. $y = -\cos 4x$

Amp: 1 Period: $\frac{2\pi}{4}$ $\frac{\pi}{2}$ Freq: $\frac{2}{\pi}$



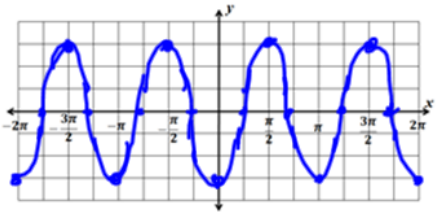
10. $f(\theta) = -4\sin\theta$

Amp: 4 Period: 2π Freq: $\frac{1}{2\pi}$



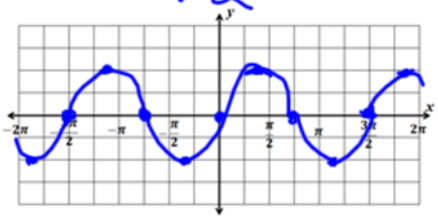
11. $y = -3\cos 2x$

Amp: 3 Period: $\frac{2\pi}{2}$ π Freq: $\frac{1}{\pi}$



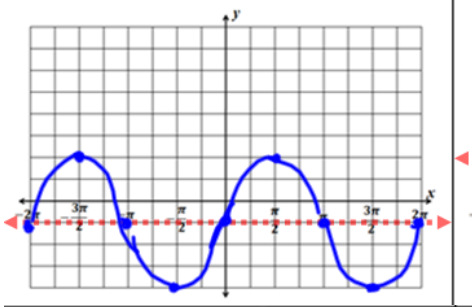
12. $y = 2\sin\frac{4}{3}x$

Amp: 2 Period: $\frac{2\pi}{\frac{4}{3}}$ $\frac{3\pi}{2}$ Freq: $\frac{2}{3\pi}$



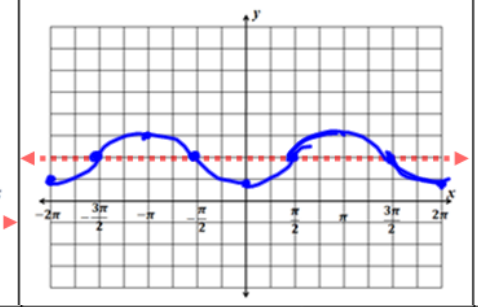
13. $f(\theta) = 3\sin\theta - 1$

Amp: 3 Period: 2π Freq: $\frac{1}{2\pi}$



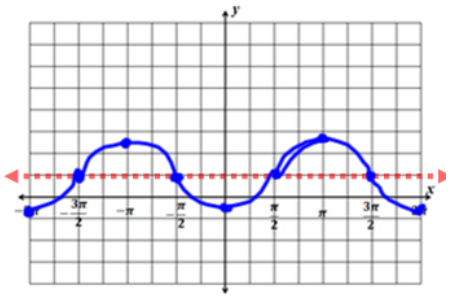
14. $f(t) = -\cos t + 2$

Amp: 1 Period: 2π Freq: $\frac{1}{2\pi}$



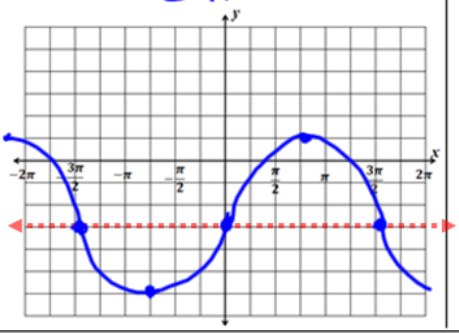
15. $y = 1 - \frac{3}{2}\cos x$

Amp: $\frac{3}{2}$ Period: 2π Freq: $\frac{1}{2\pi}$



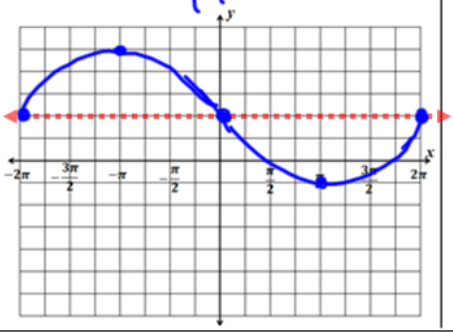
16. $y = -3 + 4\sin\frac{2}{3}x$

Amp: 4 Period: $\frac{2\pi}{2/3}$ 3π Freq: $\frac{1}{3\pi}$



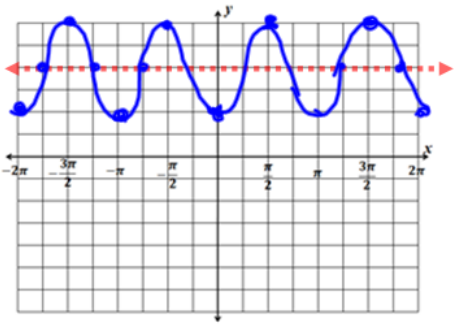
17. $f(\theta) = 2 - 3\sin\frac{1}{2}\theta$

Amp: 3 Period: $\frac{2\pi}{1/2}$ 4π Freq: $\frac{1}{4\pi}$



18. $f(t) = -2\cos 2t + 4$

Amp: 2 Period: $\frac{2\pi}{2}$ π Freq: $\frac{1}{\pi}$



For 19 – 24, use the given information to create a *sine* function.

19.
Amplitude: 5
Period: 4π
Vertical Shift: down 4

$\frac{2\pi}{b} = 4\pi$
$2\pi = 4\pi b$
$\frac{2\pi}{4\pi} = b$
$\frac{1}{2} = b$

$y = 5\sin(\frac{1}{2}x) - 4$

20.
Amplitude: 2
Period: $\frac{3\pi}{5}$
Vertical Shift: up 9

$\frac{2\pi}{b} = \frac{3\pi}{5}$
$5 \cdot 2\pi = 3\pi b$
$\frac{10\pi}{3\pi} = b$
$10/3 = b$

$y = 2\sin(\frac{10}{3}x) + 9$

21.
Amplitude: 1
Period: 4
Vertical Shift: up 1

$\frac{2\pi}{b} = 4$
$2\pi = 4b$
$\frac{2\pi}{4} = b$
$\pi/2 = b$

$y = \sin(\frac{\pi}{2}x) + 1$

22.
Amplitude: 6
Period: 3π
Vertical Shift: down 5

$\frac{2\pi}{b} = 3\pi$
$2\pi = 3\pi b$
$\frac{2\pi}{3\pi} = b$
$2/3 = b$

$y = 6\sin(\frac{2}{3}x) - 5$

23.
Amplitude: $\frac{1}{5}$
Period: $\frac{\pi}{10}$
Vertical Shift: up 15

$\frac{2\pi}{b} = \frac{\pi}{10}$
$20\pi = \pi b$
$20 = b$

$y = \frac{1}{5}\sin(20x) + 15$

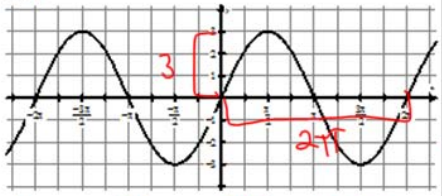
24.
Amplitude: 10
Period: $\frac{5}{6}$
Vertical Shift: down 3

$\frac{2\pi}{b} = 5/6$
$12\pi = 5b$
$\frac{12\pi}{5} = b$

$y = 10\sin(\frac{12\pi}{5}x) - 3$

For 25-27, write the equation of the following *sine* curves.

25.

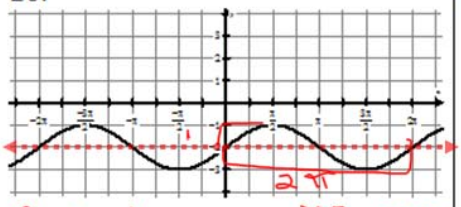


Amp = 3 $\quad \frac{2\pi}{b} = 2\pi$

$1 = b$

y = $3\sin x$

26.

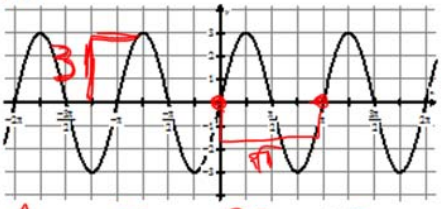


Amp = 1 $\quad \frac{2\pi}{b} = 2\pi$

Shift down 2 $\quad 1 = b$

y = $\sin x - 2$

27.



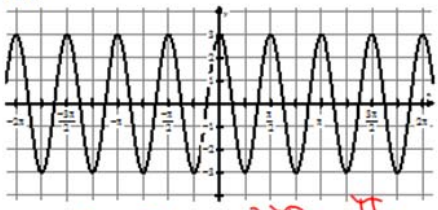
Amp = 3 $\quad \frac{2\pi}{b} = \pi$

$2 = b$

y = $3\sin 2x$

For 28-30, write the equation of the following *cosine* curves.

28.

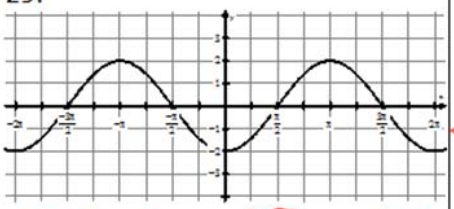


amp = 3 $\quad \frac{2\pi}{b} = \frac{\pi}{2}$

$4 = b$

y = $3\cos 4x$

29.

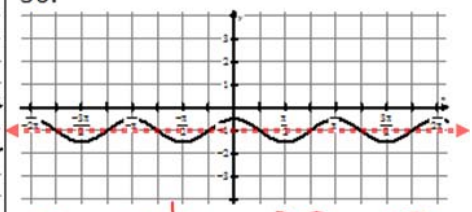


amp = 2 $\quad \frac{2\pi}{b} = 2\pi$

$1 = b$

y = $-2\cos x$

30.



amp = $\frac{1}{2}$ $\quad \frac{2\pi}{b} = \pi$

Shift down 1 $\quad 2 = b$

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

Skillz Review: Multiply Monomial by Binomial (Distribute)		
$-2x(3x-4)$	$\cos x\,(\cos x + 2)$	$3\sin\theta\,(2\sin\theta - \cos\theta)$
$-6x^2+8x$	$\cos^2 x + 2\cos x$	$6\sin^2\theta - 3\sin\theta\cos\theta$

Skillz Review: Multiply Binomial by Binomial (FOIL)		
$(2x-7)(3x+1)$	$(\cos\theta - 2)(\cos\theta + 5)$	$(\sin\theta - \tan\theta)(\sin\theta + \tan\theta)$
$6x^2+2x-21x-7$ $6x^2-19x-7$	$\cos^2\theta+5\cos\theta-2\cos\theta-10$ $\cos^2\theta+3\cos\theta-10$	$\sin^2\theta - \tan^2\theta$