

§4.1a Radian and Degree Measure

- Determine two coterminal angles in radian measure (one positive and one negative) for each angle.
 - $7\pi/9$
 - $-3\pi/7$
- Rewrite each angle in radian measure.
 - 235°
 - -100°
- Rewrite each angle in degree measure.
 - $4\pi/15$
 - $-7\pi/6$

§4.1b Linear and Angular Speed

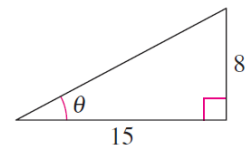
- Find the radian measure of the central angle of a circle of radius r that intercepts an arc of length s .
 - radius $r = 12$ cm, arc length $s = 15$ cm
 - radius $r = 24$ ft, arc length $s = 10$ ft
- Find the length of the arc on a circle of radius r intercepted by a central angle θ .
 - radius $r = 5$ in, central angle $\theta = 3\pi/10$ radians
 - radius $r = 60$ m, central angle $\theta = 7\pi/24$ radians
- Find the radius of a circle with an arc length s and a central angle θ .
 - arc length $s = 6$ yd, central angle $\theta = 2\pi/3$ radians
 - arc length $s = 14$ mm, central angle $\theta = 5\pi/7$ radians
- The circular blade on a saw has a diameter of 8 inches and rotates at 5000 revolutions per minute.
 - Find the angular speed of the blade in radians per second.
 - Find the linear speed of the saw teeth (in feet per second) as they contact the wood being cut.
- Suppose that a machine contains a wheel of diameter 3 feet, rotating at a rate of 1600 revolutions per minute.
 - Find the angular speed of the wheel in radians per second.
 - Find the linear speed (in feet per second) of a point on the circumference of the wheel.

§4.2 Trigonometric Functions: The Unit Circle

- Evaluate (if possible) the six trigonometric functions of the real number.
 - $t = \pi/6$
 - $t = 2\pi/3$
 - $t = 5\pi/4$
 - $t = -\pi/6$
 - $t = \pi$
 - $t = 3\pi/2$

§4.3 Right Triangle Trigonometry

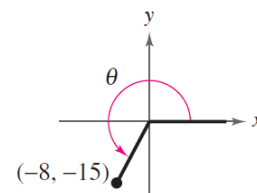
- Find the exact values of the six trigonometric functions of the angle θ shown in the figure.



- Sketch a right triangle corresponding to the trigonometric function of the acute angle θ . Find the other five trigonometric functions of θ .
 - $\sin(\theta) = 5/13$
 - $\tan(\theta) = \sqrt{3}/5$
- Assume θ is an acute angle. Use the given function value and the trigonometric identities to find the indicated trigonometric functions.
 - Given: $\sin(\theta) = 2/3$
 Find: $\csc(\theta)$, $\cos(\theta)$, $\cot(\theta)$
 - Given: $\sec(\theta) = 5/4$
 Find: $\cos(\theta)$, $\sin(\theta)$, $\tan(\theta)$

§4.4 Trigonometric Functions of Any Angle

- Determine the exact values of the six trigonometric functions of the angle θ .

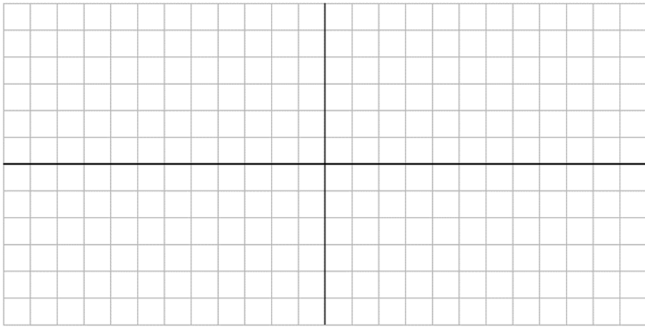


- Find the values of the six trigonometric functions of θ .
 - $\sin(\theta) = 5/13$, θ lies in Quadrant II
 - $\cot(\theta) = -5/4$, θ lies in Quadrant IV
- Evaluate (if possible) the six trigonometric functions of the real number.
 - $\pi/4$
 - $5\pi/6$
 - $4\pi/3$
 - $-\pi/3$
 - 0
 - $9\pi/2$

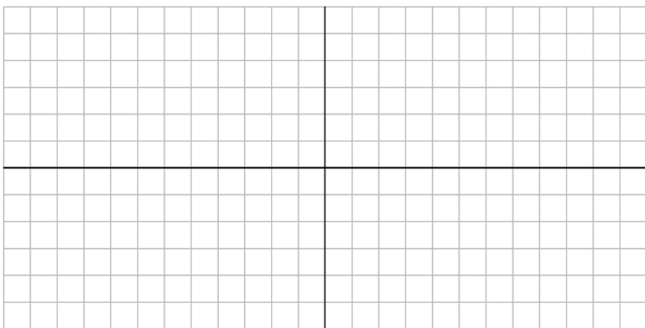
§4.5 Graphs of Sine and Cosine Functions

16. Sketch the graph of the function by hand. Identify the amplitude, period, phase shift, and vertical shift of the graph.

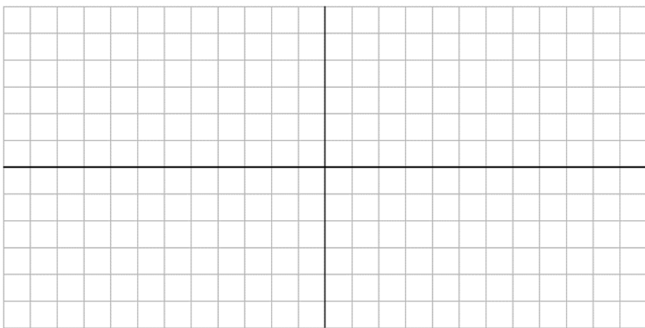
a. $y = 2\sin(x) - 1$



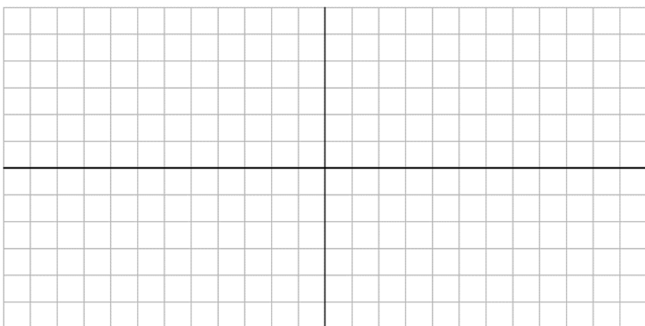
b. $y = \sin(2x) + 1.5$



c. $y = -1.5\cos\left(x + \frac{\pi}{3}\right)$



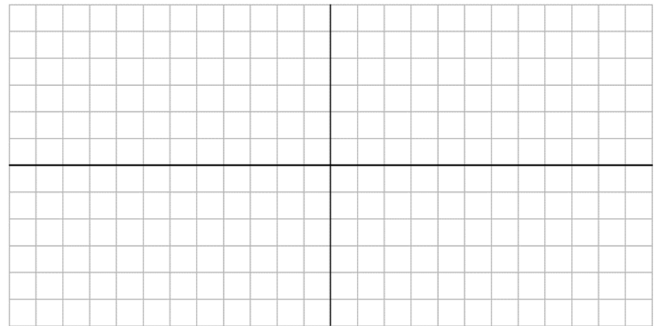
d. $y = \cos\left(\frac{x}{2} - \frac{\pi}{3}\right)$



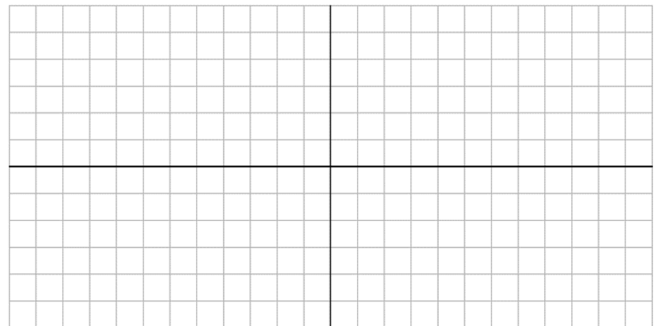
§4.6a Graphs of Tangent and Cotangent Functions

17. Sketch the graph of the function by hand. Identify the amplitude, period, and phase shift of the graph.

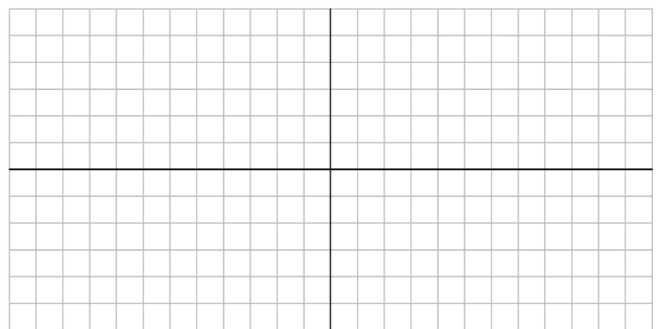
a. $y = 2\tan\left(x - \frac{\pi}{6}\right)$



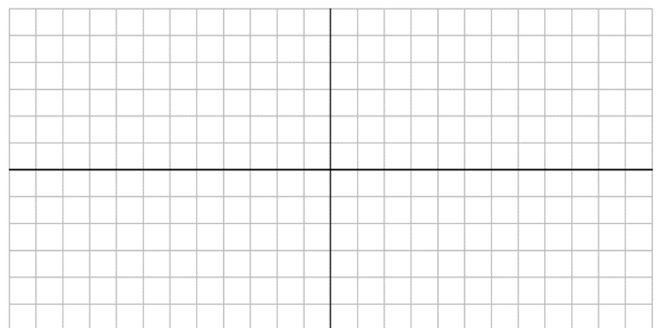
b. $y = \tan\left(\frac{x}{2} + \frac{\pi}{3}\right)$



c. $y = 1.5\cot(3x)$



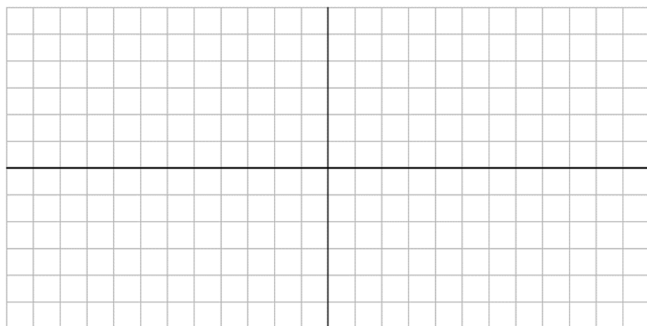
d. $y = 2.5\cot\left(x + \frac{\pi}{3}\right)$



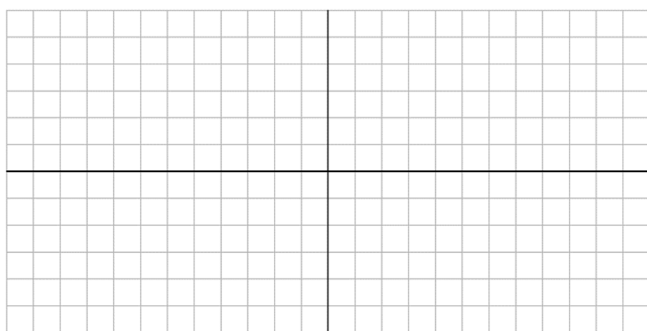
§4.6b Graphs of Secant and Cosecant Functions

18. Sketch the graph of the function by hand. Identify the period and phase shift of the graph.

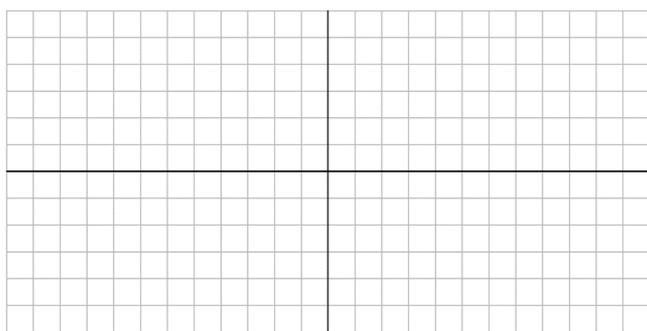
a. $y = 0.5\sec(2x)$



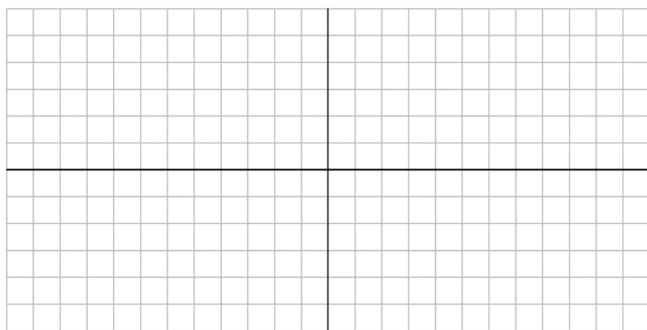
b. $y = -0.5\sec\left(x - \frac{\pi}{6}\right)$



c. $y = 1.25\csc\left(x + \frac{\pi}{3}\right)$



d. $y = \csc\left(\frac{x}{2} - \frac{\pi}{12}\right)$



§4.7a Inverse Trigonometric Functions

19. Find the exact value of each expression.

- $\arcsin(1/2)$
- $\sin^{-1}(-\sqrt{2}/2)$
- $\arcsin(-1)$
- $\cos^{-1}(\sqrt{2}/2)$
- $\arccos(-\sqrt{3}/2)$
- $\cos^{-1}(-1)$
- $\arctan(\sqrt{3})$
- $\tan^{-1}(-1/\sqrt{3})$
- $\arctan(-1)$

§4.7b Composition of Trigonometric Functions

20. Use the properties of inverse functions to find the exact value of the expression.

- $\sin(\arcsin(-0.7))$
- $\sin^{-1}\left(\sin\left(-\frac{\pi}{6}\right)\right)$
- $\cos^{-1}\left(\cos\left(\frac{\pi}{4}\right)\right)$
- $\arccos\left(\cos\left(\frac{5\pi}{3}\right)\right)$
- $\tan^{-1}\left(\tan\left(\frac{4\pi}{3}\right)\right)$
- $\arctan\left(\tan\left(\frac{11\pi}{6}\right)\right)$

21. Find the exact value of the expression.

- $\cos\left(\arctan\left(-\frac{5}{12}\right)\right)$
- $\sec\left(\arcsin\left(\frac{3}{4}\right)\right)$
- $\csc\left(\arccos\left(-\frac{\sqrt{5}}{3}\right)\right)$