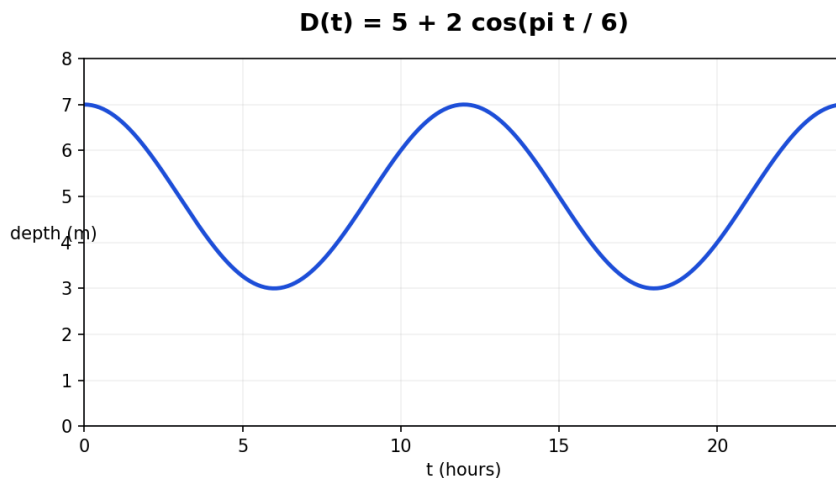


Problems | Name: _____

3.1 Periodic Phenomena

3.1.1. For $D(t) = 5 + 2\cos(\pi t/6)$, find a repeat time and evaluate $D(0)$, $D(6)$, $D(12)$.



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Time is in hours and depth in meters.

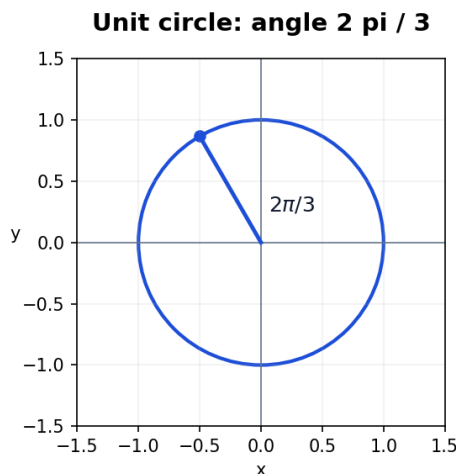
3.1.2. Does $f(0) = f(2)$ alone prove f has period 2?

3.1.3. A signal repeats every 0.25 seconds. Find its frequency in cycles per second.

Problems | Name: _____

3.2 The Unit Circle

3.2.1. Find the unit-circle coordinates at $2\pi/3$.



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Cosine is the horizontal coordinate and sine the vertical coordinate.

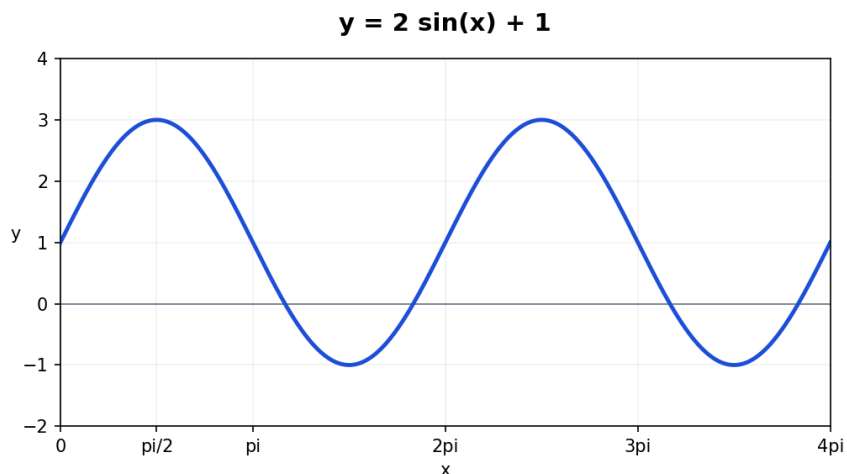
3.2.2. Find $\sin(7\pi/6)$ and $\cos(7\pi/6)$.

3.2.3. Give a positive coterminal angle for $-\pi/4$ in $[0, 2\pi)$.

Problems | Name: _____

3.3 Sinusoidal Parameters

3.3.1. For $y = 2\sin x + 1$, find amplitude, period, midline, and range.



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Read the vertical extremes and distance between repeats.

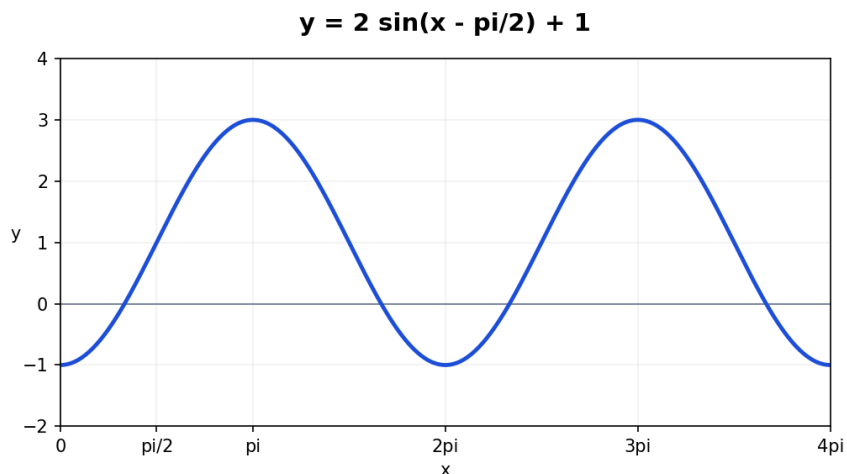
3.3.2. Find the period of $y = -4\cos(3x)$.

3.3.3. A sine model has period 8. Find a positive frequency coefficient.

Problems | Name: _____

3.4 Phase Shift

3.4.1. For $y = 2\sin(x - \pi/2) + 1$, find the shift and the value at $x = \pi/2$.



The graph crosses its midline upward at $x = \pi/2$.

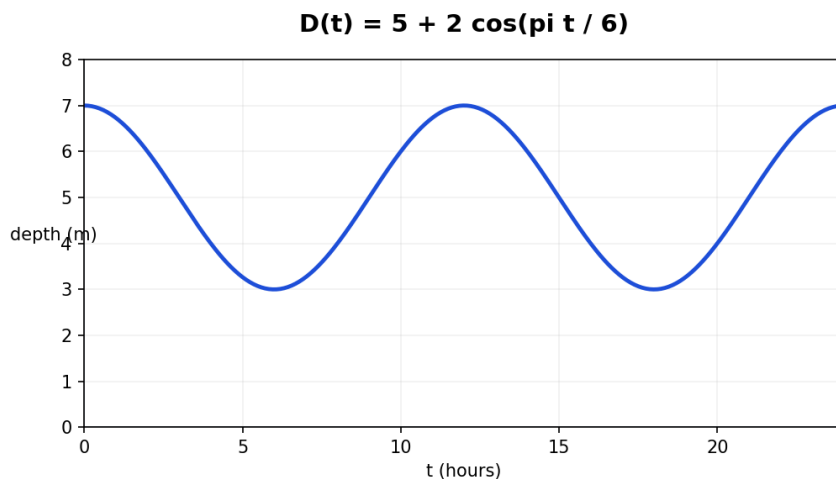
3.4.2. Factor the argument and find the shift of $y = \cos(3x + \pi)$.

3.4.3. Write a sine function of amplitude 1, period 2π , shifted right $\pi/3$.

Problems | Name: _____

3.5 Modeling with Sinusoids

3.5.1. Water depth is $D(t) = 5 + 2\cos(\pi t/6)$ meters with t in hours. Find maximum, minimum, and repeat time.



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Time is in hours and depth in meters.

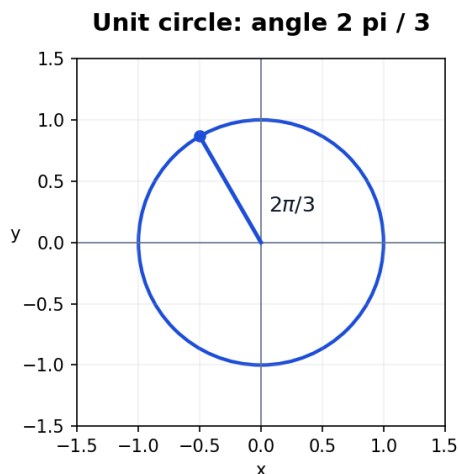
3.5.2. For the depth model, find depth at $t = 3$ and $t = 6$ hours.

3.5.3. A temperature cycles from 12 to 28 degrees every 24 hours and is maximal at $t = 0$. Give a model.

Problems | Name: _____

3.6 Trigonometric Equations and Identities

3.6.1. Solve $\sin x = \sqrt{3}/2$ on $[0, 2\pi)$.



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Cosine is the horizontal coordinate and sine the vertical coordinate.

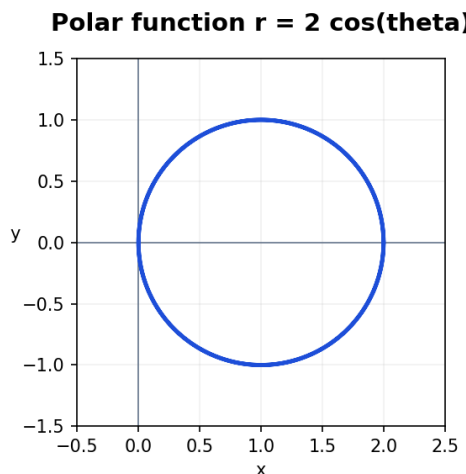
3.6.2. Solve $\sin x \cos x = 0$ on $[0, 2\pi)$.

3.6.3. Solve $2\sin^2 x - \sin x = 0$ on $[0, 2\pi)$.

Problems | Name: _____

3.7 Polar Functions

3.7.1. For $r = 2\cos\theta$, find the radius and Cartesian point at $\theta = 2\pi/3$.



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Signed radii trace a circle even when the radius is negative.

3.7.2. For $r = 3\sin\theta$, find the point at $\theta = \pi/2$.

3.7.3. Convert $r = 2\cos\theta$ to a Cartesian circle equation.