

1. Find the exact length of the arc on a circle of radius 8 centimeters intercepted by a central angle of 142 degrees.

2. Evaluate the expression without using a calculator (use the unit circle):

a) $\arcsin\left(\frac{1}{2}\right)$

b) $\arccos\left(\frac{-\sqrt{2}}{2}\right)$

c) $\arctan\left(\frac{-\sqrt{3}}{3}\right)$

. Evaluate the expression without using a calculator (use the unit circle):

a) $\arcsin\left(\sin\left(\frac{5\pi}{6}\right)\right)$

b) $\arccos\left(\cos\left(\frac{4\pi}{3}\right)\right)$

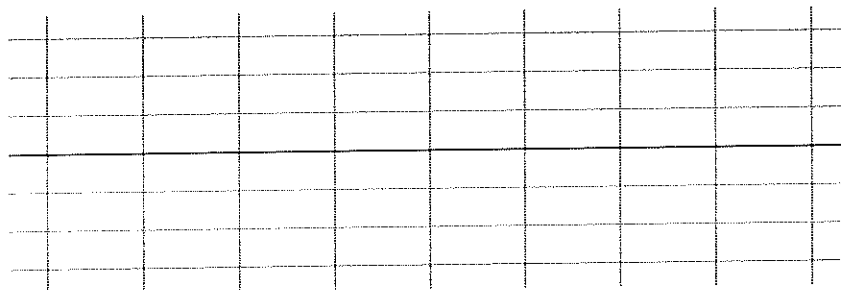
c) $\arctan\left(\tan\left(\frac{7\pi}{4}\right)\right)$

5. Find the exact value of the expression (draw a triangle in the correct quadrant):

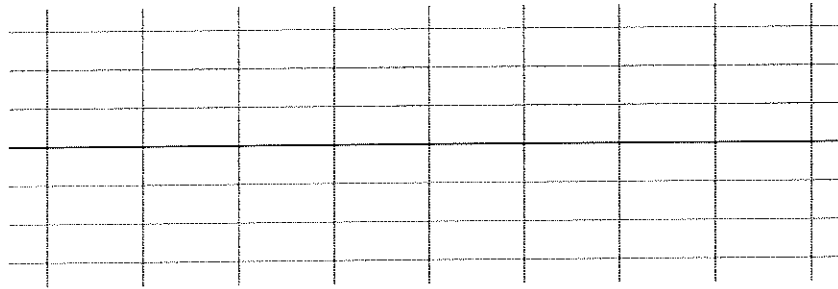
a) $\cos\left[\arctan(3)\right]$

b) $\sin\left[\arccos\left(-\frac{8}{17}\right)\right]$

6. Sketch a graph of the function by hand. Include two full periods. Be sure to accurately label all key places. $y = -2\sin\left(\pi x - \frac{\pi}{2}\right) + 1$



7. Sketch a graph of the function by hand. Include two full periods. Be sure to accurately label all key places. $y = \frac{3}{2} \sec\left(2x + \frac{\pi}{2}\right)$

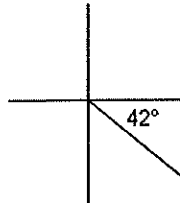


8. What is the period, phase shift and vertical shift of :

a) $y = 2 \cos\left(x - \frac{\pi}{4}\right) - 3$?

b) $y = -3 \tan\left(2x + \frac{\pi}{2}\right) + 1$?

9. What is the bearing illustrated?

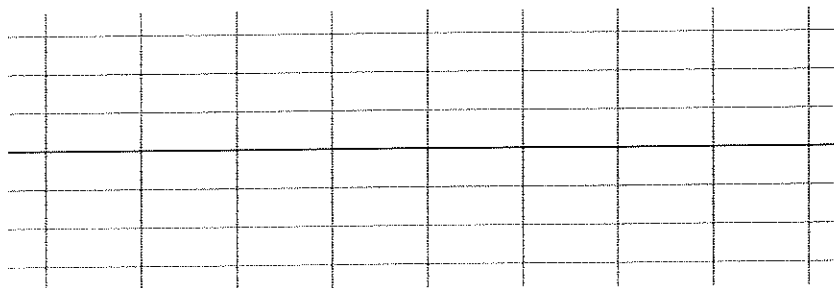


10. A balloon is tied to the ground with a 120-foot long string. A breeze is blowing the balloon to the right, pulling the line taut, and the angle of elevation to the balloon is approximately 77° . Approximate the height of the balloon above the ground.

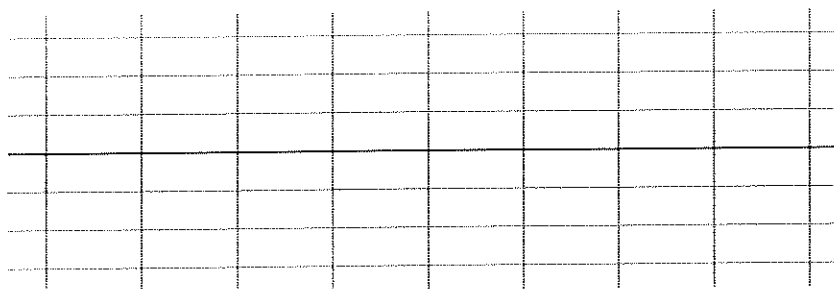
11. A ship leaves port at 11:00 A.M. with a bearing of $S 32^\circ W$. If the ship sails at 15 knots, how many nautical miles west will the ship have traveled by 5:00 P.M.?

12. An airplane takes off, and its angle of climb is 25 degrees. If its speed is a constant 400 feet per second, find the plane's altitude after three minutes.

#1. Sketch the graph of the function $f(x) = -\frac{5}{2} \csc(2x + 3\pi) + 1$



#2. Sketch the graph of the function $f(x) = 4 \cos\left(\frac{x}{2} + \frac{\pi}{8}\right) - 2$



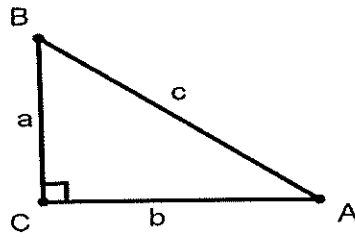
#3. Find the **exact value** of $\sin\left(\arctan\left(\frac{3}{5}\right)\right)$. (You must show a sketch!). _____

#4. Find the **exact value** of $\arccos\left(\frac{-\sqrt{3}}{2}\right)$. Degrees: _____

Radians: _____

#5. Solve the right triangle. Find side lengths to the nearest tenth.

$A = 38^\circ$, $a = 15$



$B =$ _____

$b =$ _____

$c =$ _____

#6. A ship leaves port at noon and has a bearing of $S 29^\circ W$. If the ship sails at 20 knots (nautical miles per hour), how many nautical miles south and how many nautical miles west will the ship have traveled by 6:00PM?

south: _____

west: _____

#6. A plane is currently 50 miles south and 70 miles west of the airport from which they departed. What navigational bearing has the plane been flying?