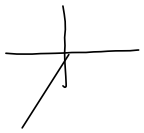
1. Question Details LarTrig9 1.8.0

Fill in the blank.

A(n) ---Select--- measures the acute angle a path or line of sight makes with a fixed north-south line.

Bearing.



2. Question Details LarTrig9 1.8.002. [2596932]

Fill in the blank.

A point that moves on a coordinate line is said to be in simple ---Select--- when its distance d from the origin at time t is given by either $d = a \sin \omega t$ or $d = a \cos \omega t$.

harmonic motion

3. Question Details

Fill in the blank.

The time for one complete cycle of a point in simple harmonic motion is its ---Select---.

$\frac{\text{time}}{1 \text{ cycle}}$ T Period

4. Question Details

Fill in the blank.

The number of cycles per second of a point in simple harmonic motion is its ---Select---.

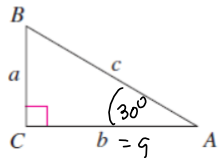
$\frac{\text{cycles}}{1 \text{ sec}}$ f frequency

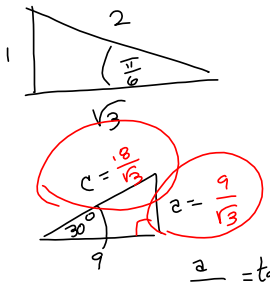
$$f = \frac{1}{T}$$

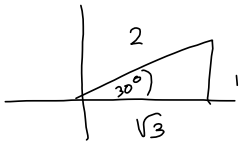
5. Question Details LarTrig9 1.8.005. [24632

Solve the right triangle shown in the figure for all unknown sides and angles. Round your answers to two decimal places.

$A = 30°, \quad b = 9$







$B = 60° = \frac{\pi}{3}$ rad

$C = 90° = \frac{\pi}{2}$ rad

$c = \frac{18}{\sqrt{3}}$

$a = \frac{9}{\sqrt{3}}$

$\cos(30°) = \frac{9}{c}$

$\Rightarrow c\cos(30°) = 9$

$\Rightarrow c = \frac{9}{\cos(30°)} = \frac{9}{(\frac{\sqrt{3}}{2})} = \frac{18}{\sqrt{3}}$

$\frac{a}{9} = \tan(30°) \Rightarrow$

$a = 9\tan(30°) = 9(\frac{1}{\sqrt{3}}) = \frac{9}{\sqrt{3}}$

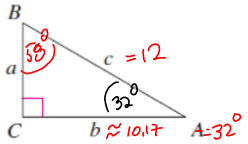
Legit

$= \frac{9\sqrt{3}}{3} = 3\sqrt{3}$

6. Question Details

Solve the right triangle shown in the figure. Round your answers to two decimal places.

$B = 58°, \quad c = 12$



$A = 90° - 58° = 32° = A$

$\cos(A) = \cos(32°) = \frac{b}{12}$

$12\cos(32°) = b \approx 10.17$

$\sin(A) = \frac{a}{12}$

$12\sin(A) = a \approx$

$12\sin(32°) = a \approx 6.36$

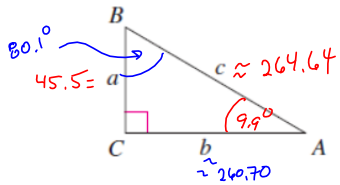
$C = 90°$

```
      10.17657715
12cos(32)
      10.17657715
12sin(32)
      6.359031171
12cos(58
      6.359031171
```

7. Question Details LarTrig9 1.8.008. [32208

Solve the right triangle shown in the figure for all unknown sides and angles. Round your answers to two decimal places.

$A = 9.9°, \quad a = 45.5$



M1

$\sin(9.9°) = \frac{45.5}{c}$

$c \sin(9.9°) = 45.5$

$c = \frac{45.5}{\sin(9.9°)} = 45.5 \csc(9.9°) \approx 264.64 \approx c$

M2:

$\frac{c}{45.5} = \csc(9.9°)$

$c = 45.5 \csc(9.9°)$

Calculator has no csc(x) button!

$\frac{45.5}{b} = \tan(9.9°)$

$45.5 = b \tan(9.9°)$

$45.5 \cot(9.9) = \frac{45.5}{\tan(9.9°)} = b \approx 260.70$

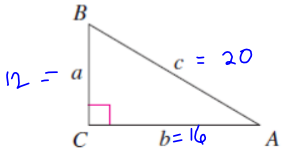
$B = 90° - 9.9° = 80.1° = B$

8. Question Details LarTrig9 1.8.009. [24632

Solve the right triangle shown in the figure for all unknown sides and angles. Round your answers to two decimal places.

$a = 12, \quad b = 16$

degrees? Radians?



$12^2 + 16^2$

$= 144 + 256$

$= 400 = 20^2$

Use inverse trig to get two angles.

$\frac{a}{c} = \sin A = \frac{12}{20} = \frac{3}{5} \Rightarrow$

$\arcsin(\sin(A)) = A = \arcsin\left(\frac{3}{5}\right) \approx 36.87° \approx A$

True if $-\frac{\pi}{2} \le A \le \frac{\pi}{2}$

A is acute so, yeah.

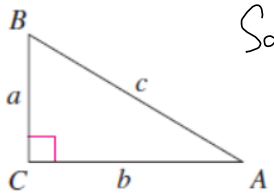
$B = 90° - A \approx 90° - 36.87°$

$= 53.13° \approx B$

9. Question Details LarTrig9 1.8.010. [2550

Solve the right triangle shown in the figure for all unknown sides and angles. Round your answers to two decimal places.

$a = 40, \quad c = 46$

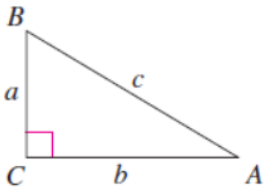


Same as #8 method

10. Question Details LarTrig9 1.8.011. [2463

Solve the right triangle shown in the figure for all unknown sides and angles. Round your answers to two decimal places.

$b = 16, \quad c = 69$

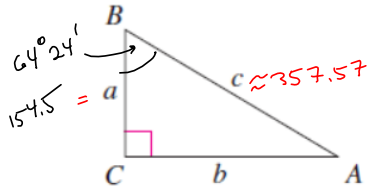


Same, only different sides given

11. Question Details LarTrig9 1.8.014. [255

Solve the right triangle shown in the figure for all unknown sides and angles. Round your answers to two decimal places

$B = 64° 24'$, $a = 154.5$



$64^\circ 24' = 64^\circ + 24'$

$= 64^\circ + (24')\left(\frac{1^\circ}{60'}\right)$

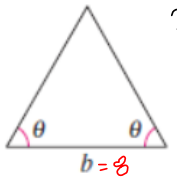
$\frac{154.5}{c} = \cos(64^\circ 24')$

$\frac{154.5}{\cos(64^\circ 24')} = c \approx 357.57$

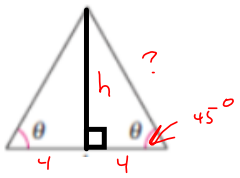
12. Question Details La

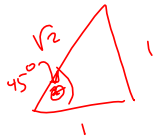
Find the altitude of the isosceles triangle shown in the figure. Round your answer to two decimal places.

$\theta = 45°$, $b = 8$



Drop a perpendicular





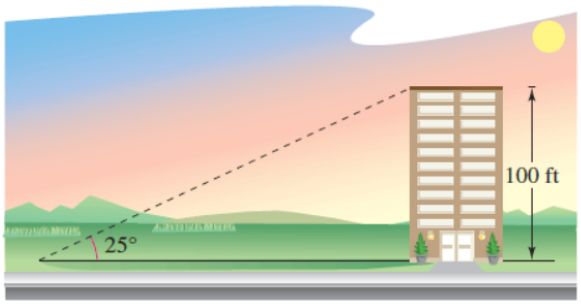
$\frac{h}{4} = \tan\theta$

$h = 4\tan 45^\circ = 4 = h$

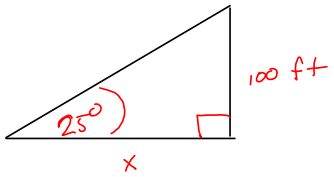
13. Question Details LarTrig9 1.8.019. [2596908]

The sun is 25° above the horizon. Find the length of a shadow cast by a building that is 100 feet tall (see figure). (Round your answer to two decimal places.)

_____ ft



Let x = the length of the shadow (ft).



$\tan 25^\circ = \frac{100}{x} \Rightarrow$

$x = \frac{100}{\tan(25^\circ)} \approx$

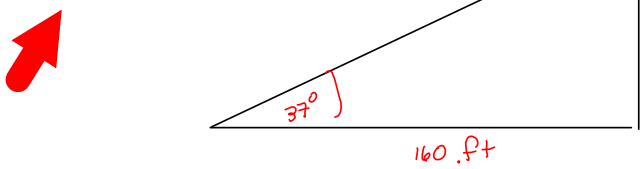
DRAW YOUR OWN Picture!

14. Question Details LarTrig9 1.8.022. [2456857]

The length of a shadow of a tree is 160 feet when the angle of elevation of the sun is 37°. Approximate the height of the tree. (Round your answer to one decimal place.)

ft

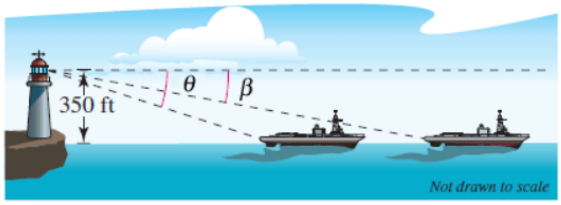
Let x = height of tree (ft)



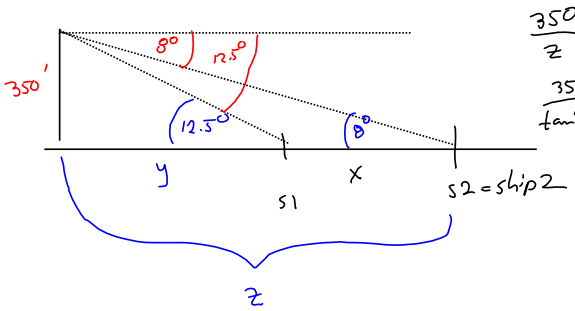
15. Question Details LarTrig9 1.8.024. [245666

An observer in a lighthouse 350 feet above sea level observes two ships directly offshore. The angles of depression to the ships are $\beta = 8°$ and $\theta = 12.5°$ (see figure). How far apart are the ships? (Round your answer to one decimal place.)

ft



x = distance between ships (ft)
z = dist. to ship2 (ft)
y = " " ship1 (ft)



$\frac{350}{z} = \tan 8°$

$\frac{350}{\tan 8°} = z \approx 2490.4$

$\frac{350}{y} = \tan(12.5°)$

$\frac{350}{\tan(12.5°)} = y \approx 1578.7$

$x = z - y \approx 2490.4 - 1578.7$, etc.

ion Details LarTrig9 1.8.026. [2456209]

serve a plane approaching overhead and assume that its speed is 650 miles per hour. The angle of elevation of the s 15° at one time and 58° one minute later. Approximate the altitude of the plane. (Round your answer to two decimal)

mi

17. Question Details LarTrig9 1.8.034. [245604

During takeoff, an airplane's angle of ascent is 17° and its speed is 300 feet per second.

(a) Find the plane's altitude after 1 minute. (Round your answer to the nearest whole number.)

_____ ft

(b) How long will it take the plane to climb to an altitude of 10,000 feet? (Round your answer to one decimal place

_____ sec

18. Question Details LarTrig9 1.8.036. [245617(

A jet leaves Reno, Nevada and is headed toward Miami, Florida at a bearing of 100°. The distance between the two cities is approximately 2472 miles.

(a) How far north and how far west is Reno relative to Miami? (Round your answers to two decimal places.)

_____ miles north

_____ miles west

(b) If the jet is to return directly to Reno from Miami, at what bearing should it travel?

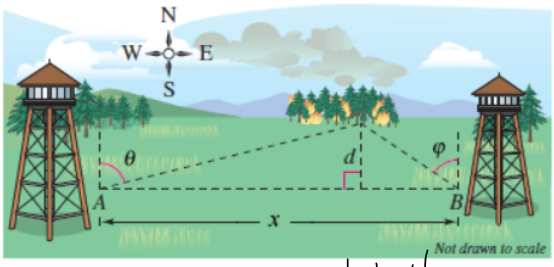
_____ °

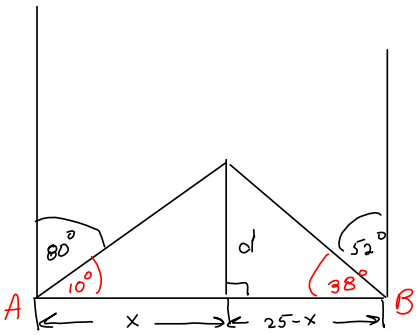
19. Question Details LarTrig9 1.8.042.MI. [2463203]

Fire tower A is $x = 25$ kilometers due west of fire tower B. A fire is spotted from the towers, and the bearings from A and B are θ = N 80° E and φ = N 52° W, respectively (see figure). Find the distance d of the fire from the line segment AB. (Round your answer to two decimal places.)

d = _____ km

d = distance to fire from $\overline{AB}$ (km)





Hey! d = d!

$\frac{d}{25-x} = \tan 38^\circ \Rightarrow d = (25-x)\tan 38^\circ$

$\frac{d}{x} = \tan 10^\circ \Rightarrow d = x\tan 10^\circ$

$(25-x)\tan(38^\circ) = x\tan(10^\circ)$ (a, b)

Linear in x.

$(25-x)a = x \cdot b$

$25a - ax = bx$

$-ax - bx = -25a$

$x(-a-b) = -25a$

$x = \frac{-25a}{-a-b} = \frac{25a}{a+b} = \frac{25\tan(38^\circ)}{\tan(38^\circ)+\tan(10^\circ)} \approx 20.39670376$

≈ 20.4 km = x

Use un-rounded to find d:

$d = x\tan(10^\circ)$

$\approx 20.39670376\tan(10^\circ)$

≈ 3.59648919

≈ 3.6 km $\approx d$

```
350/tan(12.5)
      1578.747976
25tan(38)/(tan(3
8)+tan(10))
      20.39670376
Ans*tan(10)
      3.59648919
```

20. Question Details

Find a model for simple harmonic motion satisfying the specified conditions.

Displacement ($t = 0$)	Amplitude	Period
0	1.9 meters	4 seconds

$f(x) = 1.9\sin\left(\frac{\pi}{2}x\right)$

sin(x) starts @ y=0. Use sine.

$T = 4$

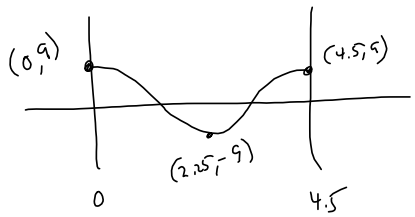
$bx = 2\pi$ when $x = 4 \Rightarrow b = \frac{2\pi}{4} = \frac{\pi}{2}$ will have period $T = 4$

$\frac{\pi}{2}x = 2\pi$ when $x = \frac{2\pi}{\left(\frac{\pi}{2}\right)} = (2\pi)\left(\frac{2}{\pi}\right) = 4$

21. Question Details

Find a model for simple harmonic motion satisfying the specified conditions.

Displacement, d ($t = 0$)	Amplitude, a	Period
9 inches	9 inches	4.5 seconds



$T = 4.5$

$bx = 2\pi$ when $x = 4.5$

$4.5b = 2\pi$

$b = \frac{2\pi}{4.5} = \frac{4\pi}{9}$

$\frac{4\pi}{9}x = 2\pi$

$x = \frac{18\pi}{4\pi} = 4.5$ ✓

$9\cos\left(\frac{4\pi}{9}x\right)$

22. Question Details LarTrig9 1.8.051. [2550721

A point on the end of a tuning fork moves in simple harmonic motion described by $d = a \sin \omega t$. Find ω given that the tuni fork for a certain note has a frequency of 272 vibrations per second.

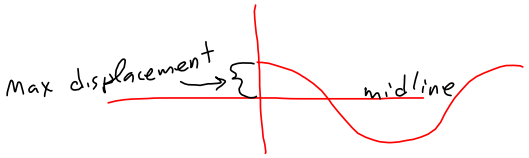
$\omega =$ [ ]

23. Question Details LarTrig9 1.8.054. [2456678]

For the simple harmonic motion described by the trigonometric function, find the maximum displacement, the frequency, the value of d when $t = 6$ and the least positive value of t for which $d = 0$. Use a graphing utility to verify your results.

$d = \frac{1}{4}\cos(16\pi t)$

(a) Find the maximum displacement, from the midline
[ ] a = amplitude $= \frac{1}{4}$.



(b) Find the frequency.
[ ] cycles per unit of time

$T = ?$

$16\pi t = 2\pi$ when?

$t = \frac{2\pi}{16\pi} = \frac{1}{8} = T$ = time for one cycle $= \frac{\text{time}}{\text{cycle}}$

$\Rightarrow f = \frac{1}{T} = 8$ cycles/unit time.

$= \frac{\text{cycles}}{\text{Time}}$

(c) Find the value of d when $t = 6$.
$d =$ [ ] $\frac{1}{4}$

$d(6) = \frac{1}{4}\cos(16\pi(6))$

$= \frac{1}{4}\cos(96\pi) = \frac{1}{4}$

(d) Find the least positive value of t for which $d = 0$.
$t =$ [ ] $\frac{1}{32}$