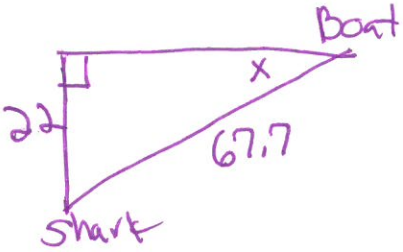
A

$y = 3\sin(2x) + 1$

A great white shark swims 22 feet below sea level. If the shark is 67.7 feet from a sailboat, what is the angle of depression from the boat to the shark?



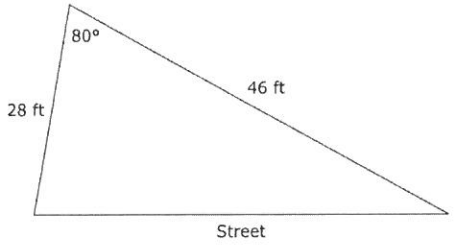
$\sin(x) = \frac{22}{67.7}$

$x = \sin^{-1}\left(\frac{22}{67.7}\right)$

$18.96°$ → B

B **18.96**

Find the area of the plot of land shown below.



SAS

$\text{Area} = \frac{1}{2}(\text{side}_1)(\text{side}_2)\sin(\angle)$

$= \frac{1}{2}(28)(46)\sin(80)$

$634.22 ft^2$ → G

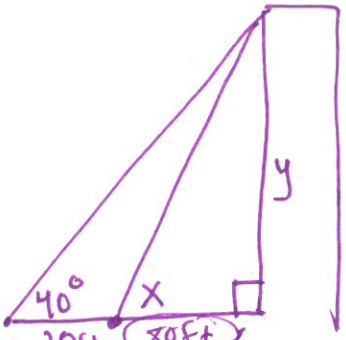
☑ Fix

43.13

☐ Fix typo

C 41.13

From a point 100 feet from the base of a building, Angelica looks up at a 40 degree angle to the top of the building. She walks 20 feet closer. At what angle must Angelica now look up to see the top of the building?



① $100 - 20 = 80$

② $\tan(40) = \frac{y}{100}$

$y = 100\tan(40)$

$y = 83.91$

③ $\tan(x) = \frac{83.91}{80}$

$x = \tan^{-1}\left(\frac{83.91}{80}\right)$

$46.37°$ → I

☑ Fix → replace Slide D

$y = -3\cos(2x) + 1$

Find amplitude, period, and midline.

amp $= |-3| =$ 3 = amp

period $= \frac{360}{2} =$ 180° period

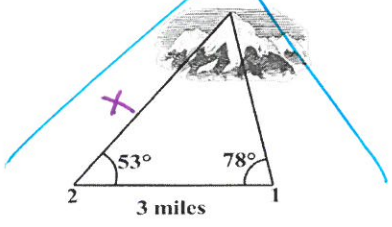
midline $y = 1$

translated up 1

$\Rightarrow y$

D 11.21

Tara wants to fix the location of a mountain by taking measurements from two positions 3 miles apart. From the first position, the angle of the mountain and the second position is 78 degrees. From the second position, the angle between the mountain and the first position is 53 degrees. From the second point, how far is Tara from the peak of the mountain?



① $180 - 53 - 78 = 49$

② $\frac{\sin(78)}{x} = \frac{\sin(49)}{3}$

$3\sin(78) = x\sin(49)$

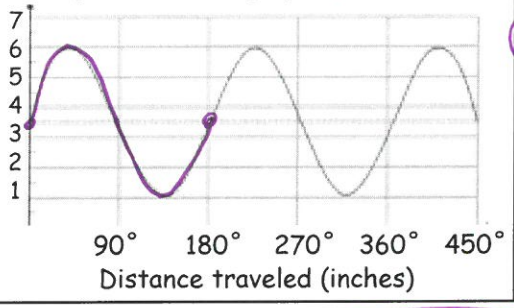
$\frac{3\sin(78)}{\sin(49)} = x$

3.89 miles = x → J

E 164.10

A new type of LED bicycle light can be attached to the spokes of the front wheel. When the bicycle moves at constant speed, a person from the side would see the light following the pattern shown. What is the equation of the graph shown?

Safety Light Motion



(1) sine graph
because "hill then valley"

(2) midline
$y = \frac{max + min}{2} = \frac{6+1}{2} = \frac{7}{2}$

$y = 3.5 = d$

(3) $amp = \frac{|max - min|}{2} = \frac{|6-1|}{2} = \frac{5}{2}$

$a = 2.5$

(not $a = -2.5$ because not reflected)

(4) period = end − start
(x) (x)

$180^\circ - 0^\circ = 180^\circ$

$period = \frac{360}{b}$

$180 = \frac{360}{b}$ $\quad 180b = 360$

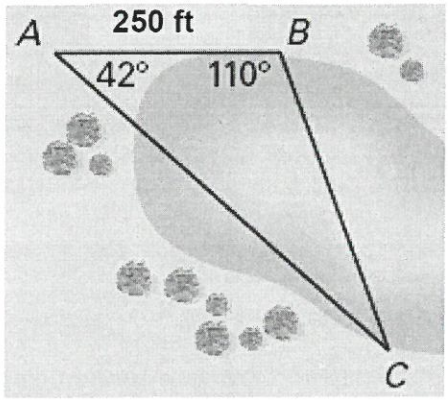
$b = 2$

$y = 2.5\sin(2x) + 3.5$

→ C

F 41.77

Find the length across the lake (BC).



(1) $180 - 110 - 42 = 28$

(2) $\frac{\sin(28)}{250} = \frac{\sin(42)}{BC}$

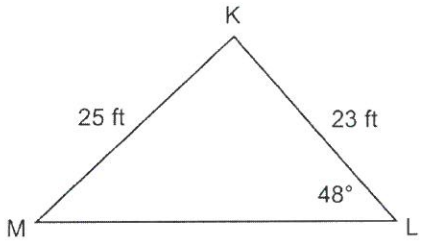
$BC\left(\frac{\sin(28)}{\sin(28)}\right) = \frac{250\sin(42)}{\sin(28)}$

$BC = 356.32$

→ F

G 634.22

What is the measure of angle M?



$\frac{\sin(48)}{25} = \frac{\sin(M)}{23}$

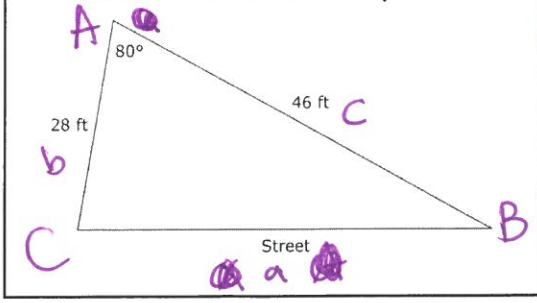
$\frac{23\sin(48)}{25} = \frac{25\sin(M)}{25}$

$.6837 = \sin M$

$43.13^\circ = M \rightarrow C$

H 31.18

Suppose that for each foot of land along the street, the annual tax is $25 per foot. How much is the annual tax for the plot?



(1) $a^2 = 28^2 + 46^2 - 2 \cdot 28 \cdot 46 \cos(80)$

$a = \sqrt{2452.682}$

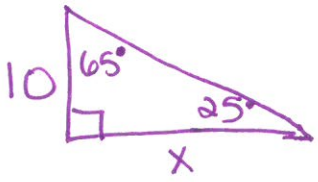
$a = 49.52$ ft = street length

(2) tax = $49.52 \text{ ft} \left(\frac{\$25 \text{ tax}}{\text{ft}}\right)$

$\$1238.11 \rightarrow R$

I 46.37

The short leg of a right triangle is 10 meters and the acute angles of the triangle are 25 degrees and 65 degrees. What is the measure of the longer leg of the triangle?



$\tan(25) = \frac{10}{x}$

$x\tan(25) = 10$

$\frac{x\tan(25)}{\tan(25)} = \frac{10}{\tan(25)}$

$x = 21.45\text{m}$

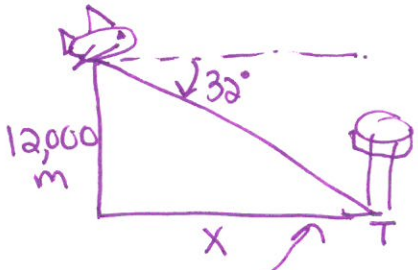
$\rightarrow T$

Fix $\Rightarrow$ replace slide J

3, 180°, y = 1

J ~~3.89~~

~~A plane is flying at an altitude of 12,000 meters. From the pilot, the angle of depression to the airport tower is 32 degrees. How far is the tower from a point directly beneath the plane?~~



① 32° because ∠ of depr. = ∠ of elev.

② $\tan(32) = \frac{12000}{x}$

$x = 12000/\tan(32)$

19204.01 $\rightarrow L$

Find amp, period, and midline for

$y = \sin(\frac{1}{2}x) - 3$

$y = \sin(\frac{1}{2}x) - 3$

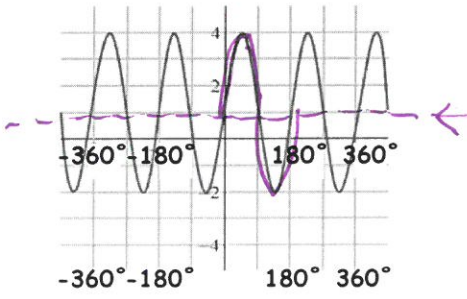
amp $= |A| = |1| = 1$ amp

per $= \frac{360}{|b|} = \frac{360}{|\frac{1}{2}|} = 720°$

midline $y = d$ $y = -3$ midline

K 30

Write the equation of the following trig function.



$y = 3\sin(2x) + 1$ → A

① Sine because "hill, then valley"

② midline
$y = \min + \text{amp}$
or
$\frac{\max + \min}{2} = \frac{-2+4}{2} = \frac{2}{2}$
$y = 1$ midline

③ $\text{amp} = \frac{|\max - \min|}{2} = \frac{|4+2|}{2} = \frac{6}{2}$
$\text{amp} = 3 \rightarrow a = 3$ not -3 because no reflection

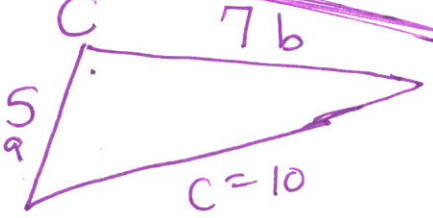
④ $\text{per} = \text{end}_x - \text{start}_x = 180 - 0 = 180$
$\text{per} = \frac{360}{b}$ $180 = \frac{360}{b}$
$b = 2$

Fix
→ slide L

L 19204.01

1, 720°, y = -3

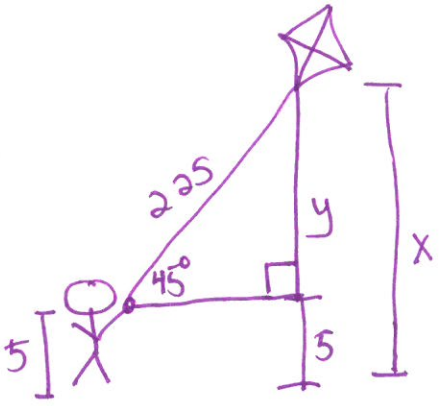
Given a triangle with a = 5, b = 7, and c = 10, find the largest angle.



$c^2 = a^2 + b^2 - 2ab\cos C$
$10^2 = 5^2 + 7^2 - 2 \cdot 5 \cdot 7 \cos C$
$100 = 25 + 49 - 70\cos C$
$106 = 74 - 70\cos C$
$-74 \quad -74$
$\frac{26}{-70} = \frac{-70\cos C}{-70}$
$-.3714 = \cos C$
$\cos^{-1}(-.3714) = C = 111.80°$
→ M

M 111.80

Suppose you hold a kite 5 feet off the ground at an angle of elevation of 45 degrees. If you let out 225 feet of string, how high above the ground is the kite?



① $\sin(45) = \frac{y}{225}$

$y = 225\sin(45) = 159.099$

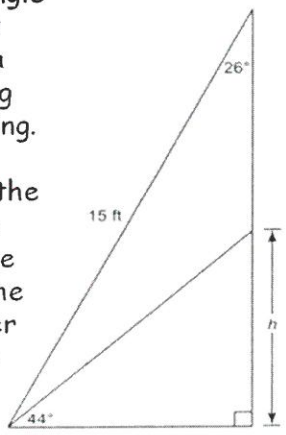
② $x = y + 5$

$x = 159.099 + 5$

$164.10\text{ ft} \rightarrow E$

N 30, 90

The hypotenuse of each right triangle shown below represents a ladder leaning against a building. Find h, the distance from the base of the building to the point where the shorter ladder touches the building.



① $\sin(26) = \frac{x}{15}$

$x = 15\sin(26)$

$x = 6.576$

② $\tan(44) = \frac{h}{6.576}$

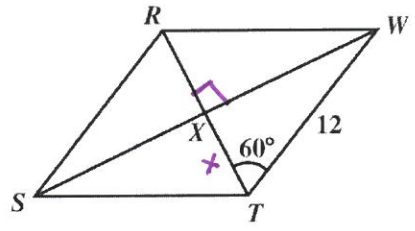
$h = 6.576\tan(44)$

$6.35\text{ ft} \rightarrow Q$

O

$$y = 2.5\sin(2x) + 3.5$$

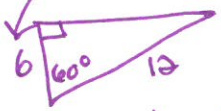
If RSTW is a rhombus, what is the area of triangle WXT? *Hint: Remember diagonals of a rhombus are perpendicular.*



① $\cos(60) = \frac{x}{12}$

$x = 12\cos(60)$

$x = 6$



SAS → Area $= \frac{1}{2}(\text{side}_1)(\text{side}_2)\sin(\angle)$

② Area $= \frac{1}{2}(6)(12)\sin(60)$

31.18 units^2

→ H

P 356.32

If $2\sin(\theta) + 2 = 3$, what are the value(s) of θ, given $0° \le \theta \le 180°$?

$2\sin(\theta) + 2 = 3$

$-2 \quad -2$

$\frac{2\sin(\theta)}{2} = \frac{1}{2}$

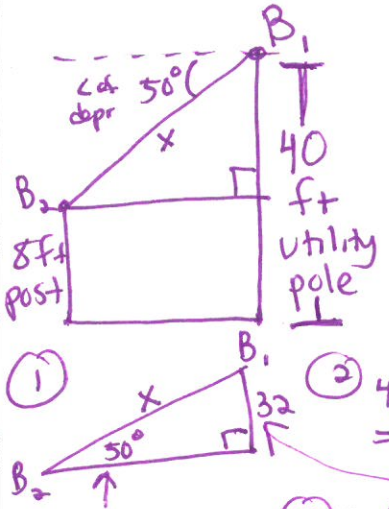
$\sin(\theta) = 1/2$

$\theta = \sin^{-1}(1/2)$

$\theta = 30°$

Q 6.35

A bird flies from the top of a 40 foot utility pole on a straight course to the top of a post eight feet tall. If the angle of depression from the utility pole to the post is 50 degrees, how far did the bird fly?



① ② 40 − 8 = 32 ft

50° because ∠of elev = ∠of depr

③ $\sin(50) = \frac{32}{x}$

$x\sin(50) = 32$

$x = \frac{32}{\sin(50)}$

41.77 ft

F

R 1238.11

Given $\cos(x) = 2\sin(x)\cos(x)$, what are the value(s) of x, given $0° \le x \le 180°$?

$\cos(x) - 2\sin(x)\cos(x) = 0$

$\cos(x)(1 - 2\sin(x)) = 0$

$\cos(x) = 0$ $\quad 1 - 2\sin(x) = 0$

$x = \cos^{-1}(0)$ $\quad \frac{1}{2} = \frac{2\sin(x)}{2}$

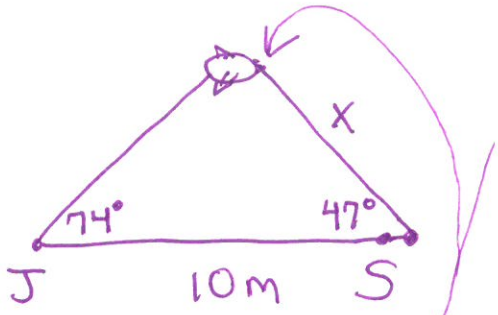
$\sin^{-1}(\frac{1}{2}) = x$

90° 30°

→ N

S 15

James is standing 10 meters away from Samantha. A bird is located in the sky at a point between where James and Samantha are standing. James is looking up at the bird at an angle of elevation of 74 degrees. Samantha is looking up at the bird at an angle of elevation of 47 degrees. How far away is the bird from Samantha?



① $180 - 74 - 47 = 59°$ = ∠ at bird

② $\frac{\sin(59)}{10} = \frac{\sin(74)}{X}$

$X\sin(59) = 10\sin(74)$

$\frac{X\sin(59)}{\sin(59)} = \frac{10\sin(74)}{\sin(59)}$

$X = 11.21\text{m}$ → D

T 21.45

If

$$\cos 2x = \frac{\sqrt{3}}{2}$$

what are the value(s) of x, given $0° \le x \le 180°$?

$\cos(2x) = \frac{\sqrt{3}}{2}$

$\cos^{-1}(\cos(2x)) = \cos^{-1}\left(\frac{\sqrt{3}}{2}\right)$

$2x = 30°$

$x = 15°$ → S

Order of the Questions

N, Q, F, P, K, A, B, G, C, I, T, S,
D, J, L, M, E, O, H, R