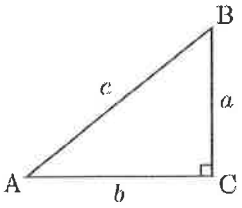
WHAT DID THE PRINCE DO WHENEVER HE FOUND A GIRL WHO MIGHT BE CINDERELLA?

Solve the following problems. Find each answer at the bottom of the page and write the letter of the exercise above it.

(T) $\csc^{-1}(-\sqrt{2})$ (H) $\arccos\left(-\frac{\sqrt{3}}{2}\right)$ (E) $\cot^{-1}\left(\frac{\sqrt{3}}{3}\right)$ (E) $\sin^{-1}(\tan\pi)$

(O) $\tan\left(\arccos\left(-\frac{\sqrt{2}}{2}\right)\right)$ (A) $\sec\left(\tan^{-1}\left(\sqrt{3}\right)\right)$



(W) Solve the right triangle to the right, given a = 6 and b = 9.

(O) From the top of the lookout tower, a forest ranger spots a fire on the ground and measures an angle of depression from the tower to the fire to be 12°. If the lookout tower is 214 feet tall, how far is the fire from the base of the tower?

(E) Give the exact value for $\cos\left(\arcsin\left(\frac{5}{11}\right)\right)$.

(N) A ship leaves port and has a bearing of S 41° E. If the ship travels 120 nautical miles, how many nautical miles south of the port is the ship?

(E) Name a few vertical asymptotes of the graph of $y = 2 + 4\sec(x - \pi)$.

(T) Evaluate $\sec^{-1}(-2)$.

(D) What is the period of the graph of the function $y = -3\tan(2x)$?

(D) Your football has landed at the edge of the roof of your school building. When you are 25 feet from the base of the building, the angle of elevation to your football is 21°. How high off the ground is your football?

(W) A jet leaves Reno, Nevada and is heading toward Miami, Florida at a bearing of 100°. The distance between the two cities is approximately 2472 miles. How far north and how far west is Reno relative to Miami?

(T) What is the period of $y = 2\csc\left(2x + \frac{\pi}{4}\right)$?.

(N) Please give the exact value for $\csc\left(\operatorname{arccot}\left(\frac{4}{x}\right)\right)$

(F) A ship is 50 miles west and 30 miles south of port. The captain wants to sail directly back to the port. What bearing should be taken?

H	E	W	E	N	T	D	O	W	N	T	O	D	E	F	E	A	T
5π	$\frac{4\sqrt{6}}{11}$	429, 2434	$\frac{\pi}{3}$	$\frac{\sqrt{16+x^2}}{x}$	$-\frac{\pi}{4}$	$\frac{\pi}{2}$	-1	10.8,33.7° 56.3°	90.6	π	1007	9.6	$\frac{3\pi}{2}, \frac{5\pi}{2}$	N59°E	0	2	$\frac{2\pi}{3}$

↑ $\frac{5\pi}{6}$

What Did The Prince Do Whenever He Found A Girl Who Might Be Cinderella?

(T) $\csc^{-1}(-\sqrt{2}) \Rightarrow \sin^{-1}\left(-\frac{1}{\sqrt{2}}\right) \Rightarrow \sin^{-1}\left(-\frac{\sqrt{2}}{2}\right) = \boxed{-\frac{\pi}{4}}$

(H) $\arccos\left(-\frac{\sqrt{3}}{2}\right) = \boxed{\frac{5\pi}{6}}$

(E) $\cot^{-1}\left(\frac{\sqrt{3}}{3}\right) \Rightarrow \tan^{-1}\left(\frac{3}{\sqrt{3}}\right) \Rightarrow \tan^{-1}\left(\frac{3\sqrt{3}}{3}\right) \Rightarrow \tan^{-1}(\sqrt{3}) = \boxed{\frac{\pi}{3}}$

(E) $\sin^{-1}(\tan \pi)$

$\sin^{-1}(0) = \boxed{0}$

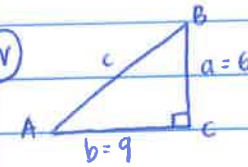
(O) $\tan\left(\arccos\left(-\frac{\sqrt{2}}{2}\right)\right)$

$\tan\left(\frac{3\pi}{4}\right) = \boxed{-1}$

(A) $\sec\left(\tan^{-1}(\sqrt{3})\right)$

$\sec\left(\frac{\pi}{3}\right) = \boxed{2}$

(W)



$6^2 + 9^2 = c^2$

$36 + 81 = c^2$

$117 = c^2$

$c = \sqrt{117}$

$\boxed{c \approx 10.8}$

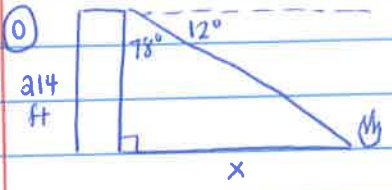
$\tan A = \frac{6}{9}$

$m\angle A = \tan^{-1}\left(\frac{6}{9}\right)$

$\boxed{m\angle A = 33.7^\circ}$

$\boxed{m\angle B = 56.3^\circ}$

(O)

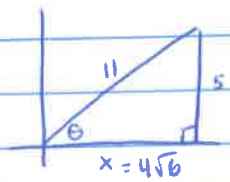


$\frac{\tan 78}{1} = \frac{x}{214}$

$x = 214 \tan 78$

$x = 1006.8 \approx \boxed{1007 \text{ ft}}$

(E) $\cos\left(\arcsin\left(\frac{5}{11}\right)\right)$



$x^2 + 5^2 = 11^2$

$x^2 + 25 = 121$

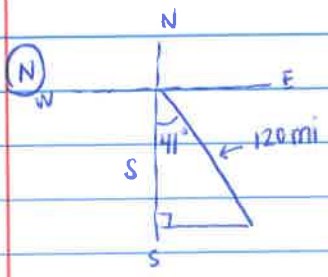
$x^2 = 96$

$x = \sqrt{96}$

$x = 4\sqrt{6}$

$\cos(\Delta) = \frac{\text{adj}}{\text{hyp}} = \boxed{\frac{4\sqrt{6}}{11}}$

(N)



$\frac{\cos 41}{1} = \frac{S}{120}$

$S = 120 \cos 41$

$\boxed{S = 90.6 \text{ mi}}$

(E) $y = 2 + 4\sec(x - \pi)$

↳ cos

$x - \pi = 0$ $\quad x = \pi$

$x - \pi = \frac{\pi}{2}$ $\quad x = \frac{3\pi}{2}$

$x - \pi = \pi$ $\quad x = 2\pi$

$x - \pi = \frac{3\pi}{2}$ $\quad x = \frac{5\pi}{2}$

$x - \pi = 2\pi$ $\quad x = 3\pi$

asymptotes at $\frac{3\pi}{2}$ and $\frac{5\pi}{2}$

new x	x	y
π	0	1
$\frac{3\pi}{2}$	$\frac{\pi}{2}$	0
2π	π	-1
$\frac{5\pi}{2}$	$\frac{3\pi}{2}$	0
3π	2π	1

(T) $\sec^{-1}(-2) \Rightarrow \cos^{-1}\left(-\frac{1}{2}\right) = \boxed{\frac{2\pi}{3}}$

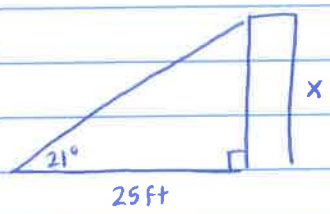
(D) consecutive asymptotes:

$2x = -\frac{\pi}{2}$ $\quad 2x = \frac{\pi}{2}$

$x = -\frac{\pi}{4}$ $\quad x = \frac{\pi}{4}$

period = dist. b/t $-\frac{\pi}{4}$ and $\frac{\pi}{4}$: $\frac{\pi}{4} - -\frac{\pi}{4} = \frac{\pi}{4} + \frac{\pi}{4} = \boxed{\frac{\pi}{2}}$

(D)

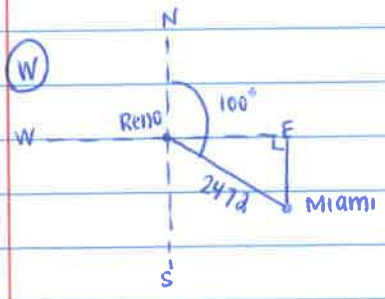


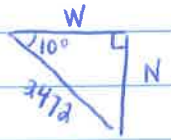
$\frac{\tan 21}{1} = \frac{x}{25}$

$x = 25 \tan 21$

$\boxed{x = 9.6 \text{ ft}}$

(W)





$\frac{\sin 10}{1} = \frac{N}{2472}$ $\quad N = 2472 \sin 10$

$\boxed{N = 429 \text{ mi}}$

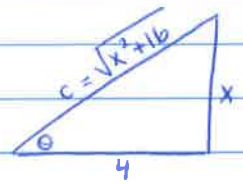
$\frac{\cos 10}{1} = \frac{W}{2472}$ $\quad W = 2472 \cos 10$

$\boxed{W = 2434 \text{ mi}}$

(T) Period $= \frac{2\pi}{b} = \frac{2\pi}{2} = \boxed{\pi}$

(N) $\csc(\text{arccot}(\frac{4}{x}))$

$\cot = \frac{\text{adj}}{\text{opp}} = \frac{4}{x}$



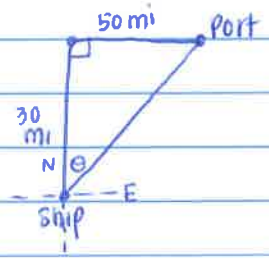
$x^2 + 4^2 = c^2$

$x^2 + 16 = c^2$

$c = \sqrt{x^2+16}$

$\csc(\Delta) = \frac{\text{hyp}}{\text{opp}} = \boxed{\frac{\sqrt{x^2+16}}{x}}$

(F)



$\tan\theta = \frac{50}{30}$

$\theta = \tan^{-1}(\frac{50}{30})$

$\theta = 59°$

$\boxed{\text{N } 59° \text{ E}}$