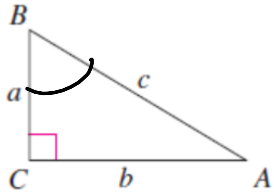
Test 1 due Wednesday.

Wednesday will be a testing day, so I will open up ZOOM for questions, but after they wrap up, we'll go dark.

If you just want to take your test, either now or on Wednesday, that's fine.

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

$b = 12.70$, $c = 51.18$



$a^2 + b^2 = c^2$

$a^2 = c^2 - b^2 = 51.18^2 - 12.7^2$

$= 2458.1024$

$\Longrightarrow a = \sqrt{2458.1024}$

≈ 49.579254

$\approx \boxed{49.58 \approx a}$

$\boxed{A \approx 75.63^\circ}$

$B = \arcsin\left(\frac{12.70}{51.18}\right) \approx 14.3677$

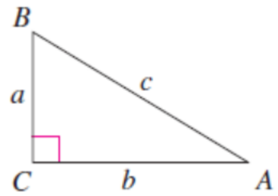
$\boxed{B \approx 14.37^\circ}$

$\boxed{C = 90^\circ}$

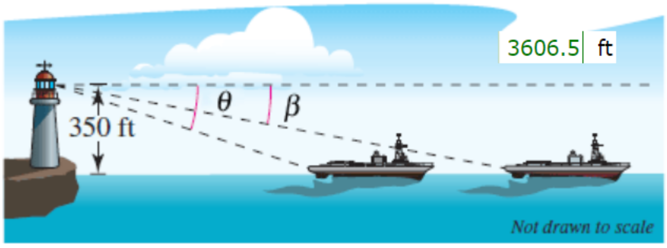
$A = 180^\circ - 90^\circ - B \approx \boxed{75.63^\circ \approx A}$

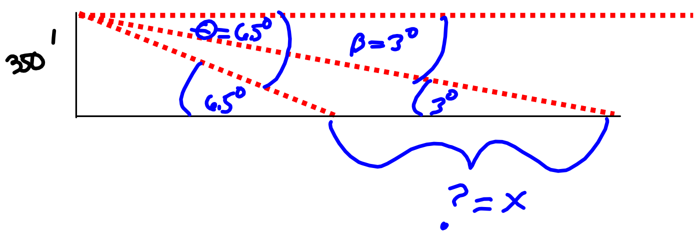
11. Solve the right triangle shown in the figure for all unknown sides and angles. Round your answers to two decimal places.

$B = 61° \, 18'$, $a = 123.5$



15. An observer in a lighthouse 350 feet above sea level observes two ships directly offshore. The angles of depression to the ships are $\beta = 3°$ and $\theta = 6.5°$ (see figure). How far apart are the ships? (Round your answer to one decimal place.)





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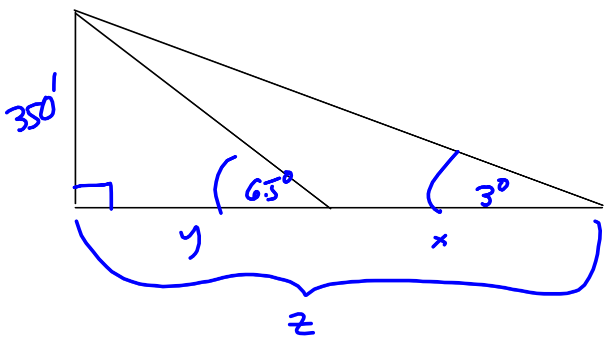
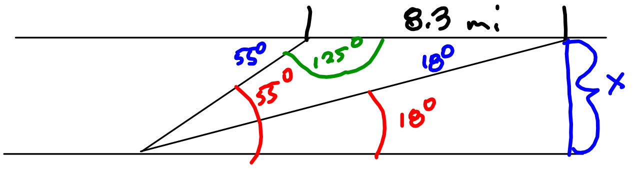


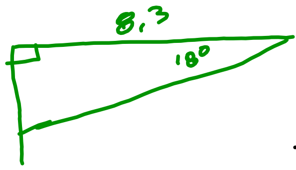
18

You observe a plane approaching overhead and assume that its speed is 500 miles per hour. The angle of elevation of the plane is 18° at one time and 55° one minute later. Approximate the altitude of the plane. (Round your answer to two decimal places.)

3.51 mi



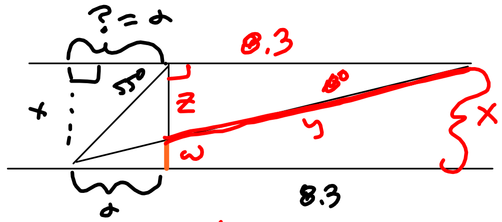
speed $= \frac{500 \text{ mi}}{\text{hr}}$



$\frac{25.000}{3} = 8.\overline{33}$

Distance = rate*time

$$\left(\frac{500 \text{ mi}}{\text{hr}}\right) \cdot (1 \text{ min})\left(\frac{1 \text{ hr}}{60 \text{ min}}\right) = \frac{50}{6} = \frac{25}{3} = 8.\overline{3} \text{ mi}$$



$\frac{z}{8.3} = \tan(18°)$

$z = 8.3\tan(18°)$

$= 8.3\tan\left(18° \cdot \frac{\pi}{180°}\right)$

$z + w = x$

$8.3\tan\left(\frac{18\pi}{180}\right) +$

$\frac{z}{y} = \sin(18\pi/180)$

$y = \frac{z}{\sin\left(\frac{9\pi}{90}\right)}$

$? = \alpha$

$$\boxed{\begin{aligned} \frac{x}{\alpha} &= \tan(55°) \\ \frac{x}{8.3+\alpha} &= \tan(18°) \end{aligned}}$$

Key

$x = x$

$\alpha\tan(55°) = (8.3+\alpha)\tan(18°)$

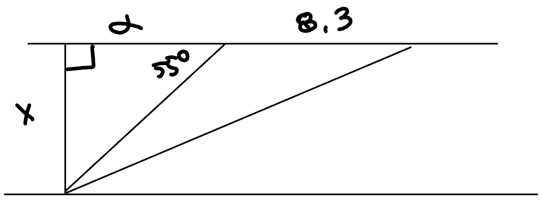
$\alpha a = (8.3+\alpha)b$, where $a = \tan(55°)$, $b = \tan(18°)$

$\alpha a = 8.3b + \alpha b$

$\alpha a - \alpha b = 8.3b$

$\alpha(a-b) = 8.3b$

$\alpha = \frac{8.3b}{a-b} = \frac{8.3\tan(18°)}{\tan(55°) - \tan(18°)} \approx$



$$\frac{x}{d} = \tan 55^\circ$$

$$x = d \tan(55^\circ)$$

What I entered into wolfram alpha:

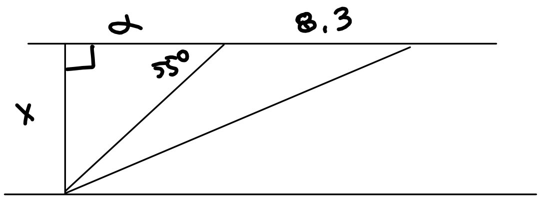
8.3tan(18*pi/180)/(tan(55*pi/180)-tan(18*pi/180)) ≈ 2.444492634

Now the calculation of *x*:

$x \approx$ tan(55*pi/180)*2.444492634066 ≈ 3.491097282837

But WebAssign says 3.51 mi !
So I'm off, somewhere.

You arbitrarily rounded the 8.33333333.... to 8.3, after lecturing everyone about not rounding before the final answer. Hypocrite.



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Lockdown Browser for Test 1:

System Requirements and Browser Settings **for lockdown browser**

1.8 #20

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

Displacement, *d* ($t = 0$)	Amplitude, *a*	Period
0	1.9 meters	8 seconds

$1.9\sin(bt)$

want $bt = 2\pi$ when $t = 8s$

$1.9\sin(\omega t)$

ω = "omega" (Greek)

$\Rightarrow 8b = 2\pi$

$b = \frac{2\pi}{8} = \frac{\pi}{4}$

$\Rightarrow f(t) = 1.9\sin(\frac{\pi}{4}t)$

Frequency is the reciprocal of wavelength/period.

$\frac{\text{sec}}{\text{cycle}}$ = Period

$\frac{\text{cycles}}{\text{sec}}$ = Frequency

Click here for an example cheat sheet.

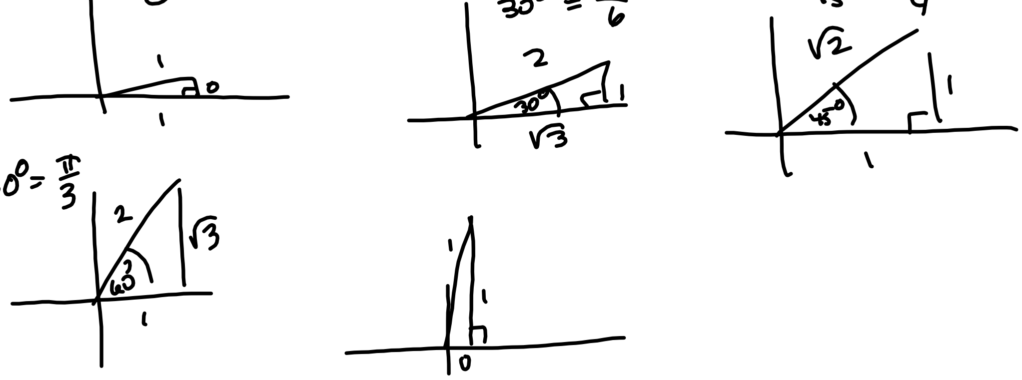
Most of that crap is from Chapter 2 and beyond.

One Page. One Side. Full of what you might need.

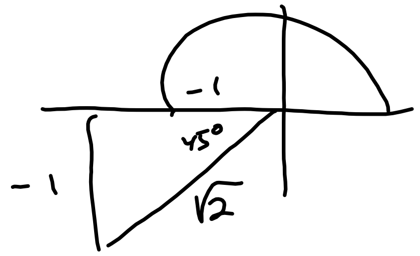
$126^\circ = (126^\circ)\left(\frac{\pi}{180}\right) = (\overset{7}{\cancel{63}})\left(\frac{\pi}{\underset{10}{\cancel{90}}}\right)$

$= \frac{7\pi}{10}$ EXACT, Not rounded

$0^\circ = 0$ $30^\circ = \frac{\pi}{6}$ $45^\circ = \frac{\pi}{4}$ $60^\circ = \frac{\pi}{3}$



$\sin(225^\circ) = -\frac{1}{\sqrt{2}}$



1.8 #23

For the simple harmonic motion described by the trigonometric function, find the maximum displacement, the frequency, the value of d when $t = 3$ and the least positive value of t for which $d = 0$. Use a graphing utility to verify your results.

$$d = \frac{1}{2}\cos(22\pi t)$$

(a) Find the maximum displacement.

1/2

(b) Find the frequency.

11 cycles per unit of time

(c) Find the value of d when $t = 3$.

$d =$ 1/2

(d) Find the least positive value of t for which $d = 0$.

Period: $22\pi t = 2\pi \Rightarrow$

$t = \frac{2\pi}{22\pi} = \frac{1}{11} = T \Rightarrow$

$f = \frac{1}{T} = 11$

Evaluate $d(3) = \frac{1}{2}\cos(22\pi \cdot 3)$

$= \frac{1}{2}\cos(66\pi)$

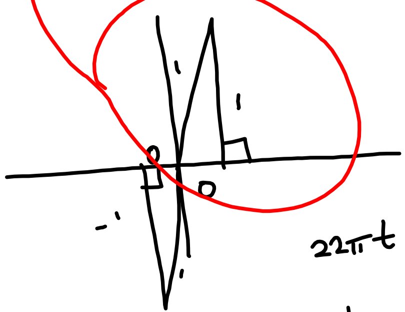
$= \frac{1}{2}\cos(2\pi \cdot 33)$

$= \frac{1}{2}\cos(2\pi)$

$= \frac{1}{2}\cos(0) = \frac{1}{2}(1) = \frac{1}{2}$

$\frac{1}{2}\cos(22\pi t) = 0$

$\Rightarrow \cos(22\pi t) = 0$



$22\pi t = \frac{\pi}{2}$

$t = \frac{\pi}{2 \cdot 22\pi} = \frac{1}{44}$ s