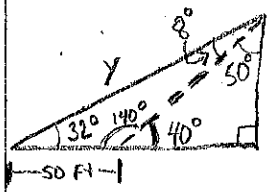
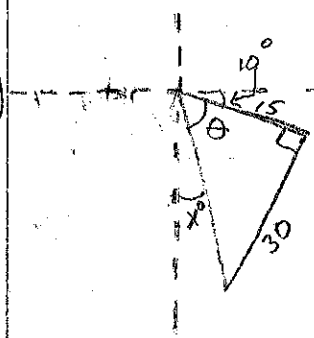
7.1 - 7.3 Extra Practice (Quiz Prep) Solutions

1.) 

$$\frac{\sin 8}{50} = \frac{\sin 140}{y}$$

$$y = \frac{50 \sin 140^\circ}{\sin 8^\circ} \approx 230.93 \text{ Ft}$$

$$\sin 32^\circ = \frac{x}{230.93} \rightarrow x = 230.93 \sin 32^\circ = \boxed{122.37 \text{ Ft}}$$

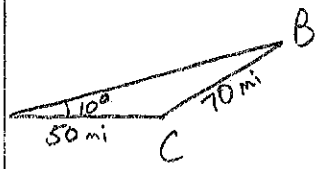
2.) 

$$\tan\theta = \frac{30}{15} \rightarrow \tan\theta = 2$$

$$\theta = \tan^{-1}(2) = 63.43$$

$$x = 90 - (63.43 + 10) = \underline{16.57^\circ}$$

Solution: $\boxed{S\ 16.57^\circ E}$

3.) 

$$\frac{\sin 10}{70} = \frac{\sin B}{50}$$

$$B = \sin^{-1}\left[\frac{50 \sin 10}{70}\right] = 7.125^\circ$$

$$C = 180 - (10 + 7.125) = 162.875^\circ$$

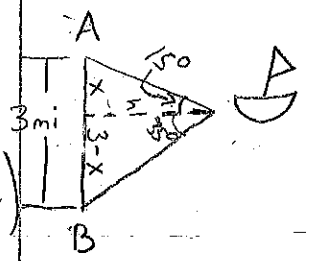
$$\frac{\sin 10}{70} = \frac{\sin 162.875}{c}$$

$$c = \frac{70 \sin 162.875}{\sin 10} = \underline{118.7}$$

$$(70+50) - 118.7 = 1.3$$

$$\frac{1.3 \text{ mi}}{250 \text{ mi/hr}} \cdot 3600 \text{ sec} = \boxed{18.72 \text{ sec}}$$

4.)



$\tan 15 = \frac{x}{h} \rightarrow h = \frac{x}{\tan 15}$

$\tan 35 = \frac{3-x}{h} \quad h = \frac{3-x}{\tan 35}$

$\frac{x}{\tan 15} = \frac{3-x}{\tan 35}$

$x \tan 35 = 3\tan 15 - x\tan 15$

$x\tan 35 + x\tan 15 = 3\tan 15$

$\frac{x(\tan 35 + \tan 15)}{\tan 35 + \tan 15} = \frac{3\tan 15}{\tan 35 + \tan 15}$

a.) $\sin 15^\circ = \frac{.83}{b}$

$\boxed{x = .83}$ $\quad \boxed{3-x} = 3 - .83 = \underline{2.17}$

$b = \frac{.83}{\sin 15^\circ} \approx \boxed{3.21 \text{ mi}}$

↳ Distance from ship to lighthouse A

b.) $\sin 35^\circ = \frac{2.17}{a}$

$a = \frac{2.17}{\sin 35^\circ} = \boxed{3.78 \text{ mi}}$ → Distance from ship to lighthouse B

c.) $h = \frac{x}{\tan 15^\circ}$ (from above)

$h = \frac{.83}{\tan 15^\circ} \rightarrow \boxed{h = 3.1 \text{ mi}}$ → Distance from ship to shore

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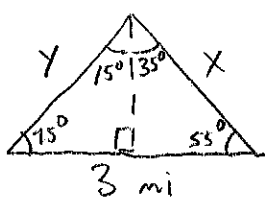
easier way

4.)

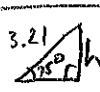


$\frac{\sin 50}{3} = \frac{\sin 55}{Y}$ $\quad Y = \frac{3\sin 55}{\sin 50} = \boxed{3.21 \text{ mi}}$ ship to A

or

$\frac{\sin 50^\circ}{3} = \frac{\sin 75^\circ}{X}$

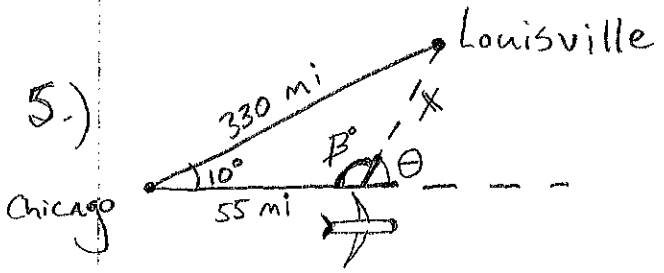
$X = \frac{3\sin 75^\circ}{\sin 50^\circ} = \boxed{3.78 \text{ mi}}$ ship to A



$\sin 75^\circ = \frac{h}{3.21}$ $\quad h = 3.21\sin 75^\circ$

$\boxed{h = 3.1}$ ship to shore

5.)



a.) If the aircraft travels 220 mph for 15 mins, then the aircraft traveled $220 \cdot \frac{1}{4}\text{ hr} = 55\text{ mi}$

① $X = \sqrt{(55)^2 + (330)^2 - 2(55)(330)\cos 10^\circ}$

$X = 276\text{ mi}$

- To find θ (the angle the pilot should turn to head towards Louisville), you need to find B. $[\theta = 180 - B]$

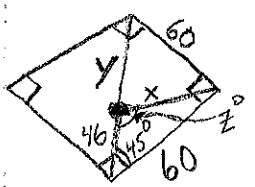
② $B = \cos^{-1}\left[\frac{(55)^2 + (276)^2 - (330)^2}{2(55)(276)}\right]$

$B = 168^\circ \rightarrow$ ③ $\theta = 180 - 168 = \boxed{12^\circ}$

b.) Total distance $= 55 + 276 = \underline{331\text{ mi}}$

$\text{rate} = \frac{\text{distance}}{\text{time}} = \frac{331\text{ mi}}{90\text{ mins}} = \frac{331\text{mi}}{1.5\text{ hrs}} = \boxed{220.7\text{mi/hr}}$

6.)



a.) $X = \sqrt{(46)^2 + (60)^2 - 2(46)(60)\cos 45^\circ}$

$\boxed{X = 42.58\text{ Ft}}$ → distance from pitch to 1st base

b.) Find distance from home to 2nd, then subtract 46 from that value

$d = \sqrt{(60)^2 + (60)^2} = 84.85\text{ Ft}$

$y = 84.85 - 46 = \boxed{38.85\text{ Ft}}$ dist. from pitch to 2nd

c.) $z = \cos^{-1}\left[\frac{(46)^2 + (42.58)^2 - (60)^2}{2(46)(42.58)}\right] = \boxed{85.18^\circ}$