SI Week 3 Answers

1\. a.

$\sin(A) = \frac{CB}{AB} = \frac{XZ}{YZ} = \frac{7.2}{17} = \boxed{.4235}$

$\tan(A) = \frac{CB}{CA} = \frac{XZ}{XY} = \frac{7.2}{15.4} = \boxed{.4675}$

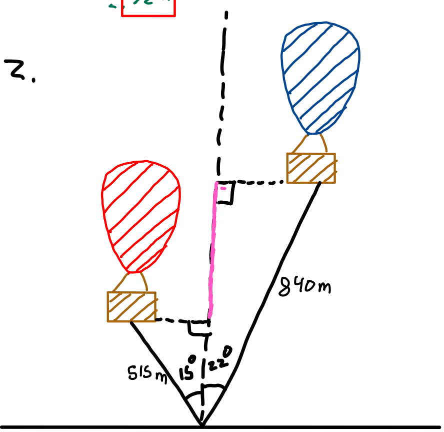
$\cos(A) = \frac{CA}{AB} = \frac{XY}{YZ} = \frac{15.4}{17} = \boxed{.9058}$

b. $\sin(C) = \frac{BA}{AC} = \frac{XY}{YZ} = \frac{14.7}{20.3} = \boxed{.7241}$

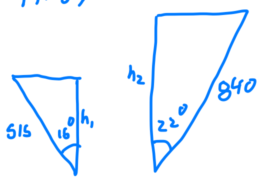
$\tan(C) = \frac{BA}{BC} = \frac{XY}{XZ} = \frac{14.7}{14} = \boxed{1.05}$

$\cos(C) = \frac{BC}{AC} = \frac{XZ}{YZ} = \frac{14}{20.3} = \boxed{.6896}$

2\.



First, break up the 2 triangles



$\Rightarrow \cos(15°) = \frac{h_1}{515}$

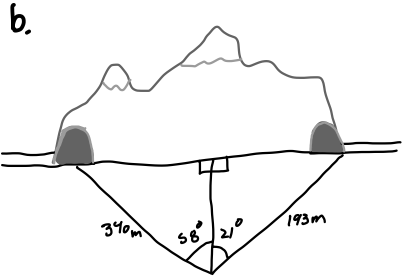
$\therefore 515\cos(15°) = h_1$

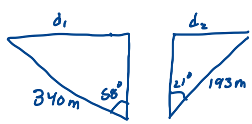
$\Rightarrow \cos(22°) = \frac{h_2}{840}$

$\therefore 840\cos(22°) = h_2$

$h_2 - h_1 \Rightarrow 840\cos(22°) - 515\cos(15°) = \boxed{281.382\,m}$

b.



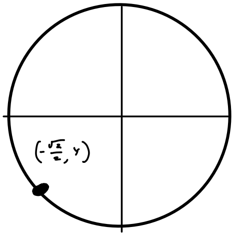


$\sin 58° = \frac{d_1}{340}$ $\quad$ $\sin 21° = \frac{d_2}{193}$

$340\sin 58° = d_1$ $\quad$ $193\sin 21° = d_2$

$d_1 + d_2 \Rightarrow 340\sin 58° + 193\sin 21° = \boxed{357.501}$

3. a. $\left(-\frac{\sqrt{2}}{2}, y\right)$



Since the equation for the unit circle is $x^2+y^2=1$ then...

$\left(-\frac{\sqrt{2}}{2}\right)^2+y^2=1$ is true

$\frac{2}{4}+y^2=1 \Rightarrow y^2=\frac{1}{2}$

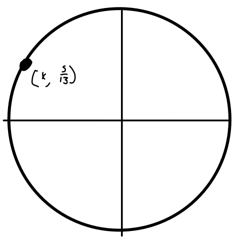
$y=\pm\sqrt{\frac{1}{2}}$

$y=\pm\frac{1}{\sqrt{2}}$

$y=\pm\frac{\sqrt{2}}{2}$

$\rightarrow$ Since this point is in Q3, this y must be negative, so $y=\boxed{-\frac{\sqrt{2}}{2}}$

b. $\left(x, \frac{5}{13}\right)$



$x^2+\left(\frac{5}{13}\right)^2=1$

$x^2+\frac{25}{169}=1$

$x^2=1-\frac{25}{169}$

$x^2=\frac{169}{169}-\frac{25}{169}=\frac{144}{169}$

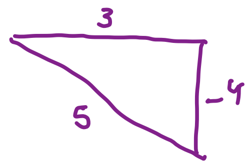
$x=\pm\frac{12}{13}$

Since this is in Q2, this must be negative, so $\boxed{x=-\frac{12}{13}}$

4. a. Since sine & tangent are negative, It must be in Q4

S	A
T	C

Now, we can draw a triangle



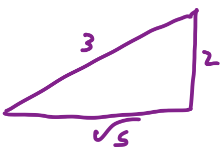
$\tan = \frac{opp}{adj} = \boxed{-\frac{4}{3}}$

$\sec = \frac{hyp}{adj} = \boxed{\frac{5}{3}}$

b.

S	A
T	C

$\Rightarrow$ Q_1



$2^2+b^2=9$

$b^2=5$

$b=\sqrt{5}$

$\tan\theta=\frac{2}{\sqrt{5}}=\boxed{\frac{2\sqrt{5}}{5}}$

$\cos\theta=\boxed{\frac{\sqrt{5}}{3}}$