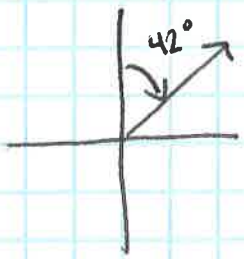
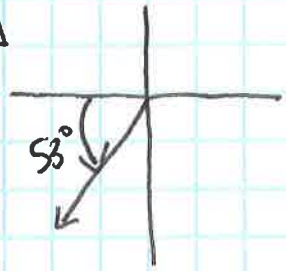
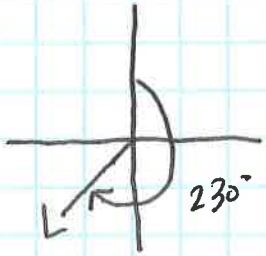
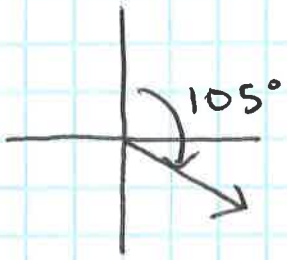
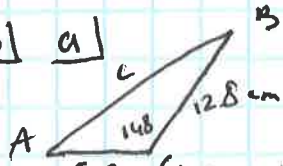
8.1 / 8.2 Quest Review

1] 

2] 

3] 

4] 

5] a 

$c^2 = 5.2^2 + 12.8^2 - 2(5.2)(12.8)\cos 148°$

$c = 15.727\text{cm}$

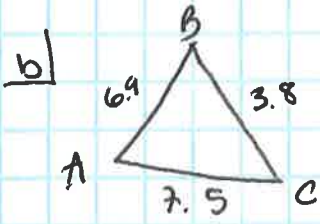
$\frac{\sin 148}{15.727} = \frac{\sin B}{5.2}$

$B = \sin^{-1}\left(\frac{5.2\sin 148}{15.727}\right)$

$B = 10.091°$

$A = 180° - (148 + 10.091)$

$A = 21.909°$

b 

$\cos B = \frac{6.9^2 + 3.8^2 - 7.5^2}{2(6.9)(3.8)}$

$B = \cos^{-1}\left(\frac{5.8}{52.44}\right)$

$B = 83.65°$

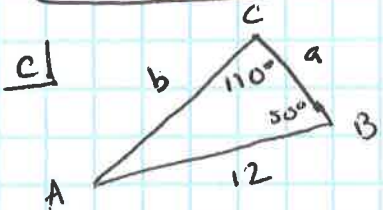
$\frac{\sin A}{3.8} = \frac{\sin 83.65}{7.5}$

$A = \sin^{-1}\left(\frac{3.8\sin 83.65}{7.5}\right)$

$A = 30.236°$

$C = 180° - (83.65 + 30.236°)$

$C = 66.114°$

c 

$180° - (50° + 110°)$

$A = 20°$

$\frac{12}{\sin 110°} = \frac{b}{\sin 50}$

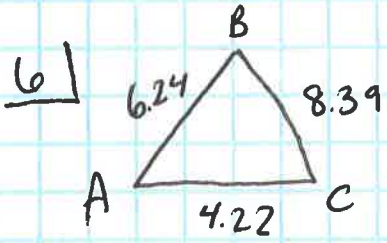
$12\sin 50° = \sin 110° \; b$

$9.782 = b$

$\frac{a}{\sin 20°} = \frac{12}{\sin 110°}$

$a = \frac{12\sin 20}{\sin 110}$

$a = 4.368$

6] 

$\cos A = \frac{4.22^2 + 6.24^2 - 8.39^2}{2(4.22)(6.24)}$

$A = \cos^{-1}\left(\frac{-11.4781}{441.864}\right)$

$A = 91.557°$

$\frac{\sin B}{4.22} = \frac{\sin 91.557°}{8.39}$

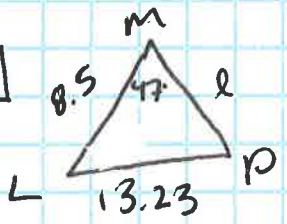
$B = \sin^{-1}\left(\frac{4.22\sin 91.557°}{8.39}\right)$

$B = 30.185°$

$C = 180° - (30.185° + 91.557°)$

$C = 58.258°$

7]



$\frac{\sin P}{8.5} = \frac{\sin 47}{13.23}$

$P = \sin^{-1}\left(\frac{8.5 \sin 47}{13.23}\right)$

$P = 28.026°$

$L = 180 - (47 + 28.026)$

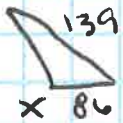
$L = 104.974°$

$\frac{l}{\sin 104.974} = \frac{13.23}{\sin 47}$

$l = \frac{13.23 \sin 104.974}{\sin 47}$

$l = 17.475 cm$

8]

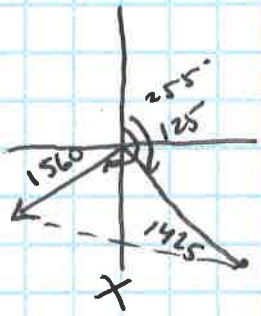


$\cos X = \frac{71^2 + 86^2 - 139^2}{2(71)86}$

$x = \cos^{-1}\left(\frac{-6884}{12212}\right)$

$x = 124.313°$

9]



$\angle X = 255° - 125°$

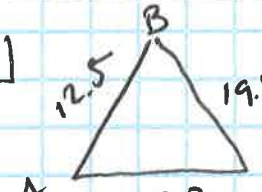
$X = 130°$

$x^2 = 1425^2 + 1560^2 - 2(1425)(1560)\cos 130°$

$x = 2705.93$

The planes are 2705.93 miles apart

10]



$\cos A = \frac{12.5^2 + 15.7^2 - 19.8^2}{2(12.5)(15.7)}$

$A = \cos^{-1}\left(\frac{10.7}{495}\right)$

$A = 88.761°$

11] $S = \frac{12.5 + 19.8 + 15.7}{2}$

$S = \frac{48}{2} = 24$

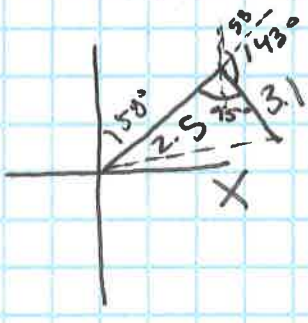
$A = \sqrt{24(24-12.5)(24-19.8)(24-15.7)}$

$A = 98.089 ft^2$

or $A = \frac{1}{2}(12.5)(15.7)\sin 88.761$

$A = 98.102 ft^2$

12]



$143 - 50 = 85°$

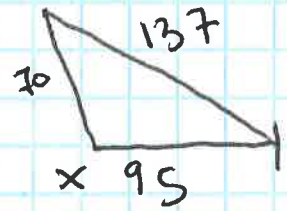
$180 - 85° = 95°$

$x^2 = 3.1^2 + 2.5^2 - 2(3.1)(2.5)\cos 95°$

$x = 4.149$

Sara + Geoff are 4.149 miles away

13]

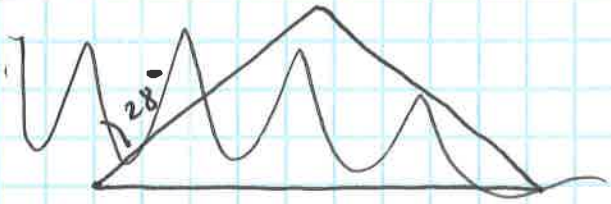


$$\cos X = \frac{70^2+95^2-137^2}{2(70)(95)}$$

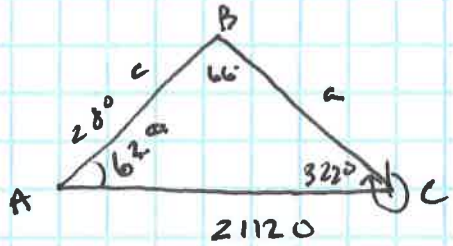
$$X = \cos^{-1}\left(\frac{-4844}{13300}\right)$$

$$\boxed{X = 111.359^\circ}$$

14]



21120



$A = 90-28 = 62^\circ$

$c = 322-270 = 52^\circ$

$B = 180^\circ - (62+52)^\circ$

$B = 66^\circ$

$$\frac{a}{\sin 62^\circ} = \frac{21120}{\sin 66}$$

$$a = \frac{21120\sin 62}{\sin 66}$$

$$a = 20{,}412.617$$

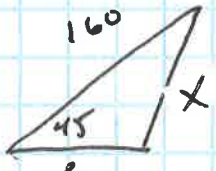
$$\frac{16}{\sin 52} = \frac{21120}{\sin 66}$$

$$c = \frac{21120\sin 52}{\sin 66}$$

$$c = 18217.799$$

Forrest was 18,217.799 feet from the tower @ the start of day + ~~20,241~~ 20,412.617 feet when he finished

15]

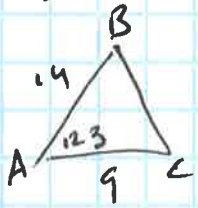


$$x^2 = 30^2+160^2 - 2(30)(160)\cos 45^\circ$$

$$x = 140.399$$

The new cable must be 140.399 meters long

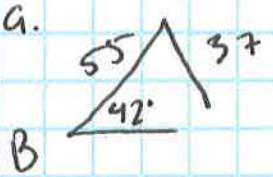
16]



$$A = \frac{1}{2}(14)(9)\sin 123$$

$$\boxed{A = 52.836\ in^2}$$

17| a.

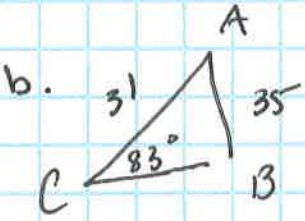


$h = 55 \sin 42$

$h = 36.802$

$36 < 37 < 55$ 2 $\triangle$'s

b.



$h = 31 \sin 83°$

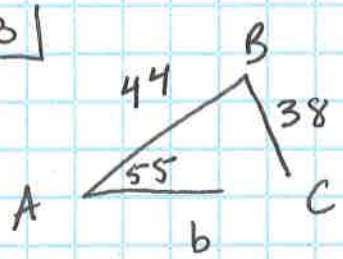
$h = 30.769$

$35 > 31$

30.769

1 oblique $\triangle$

18|



$h = 44 \sin 55$

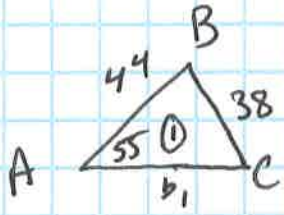
$h = 36.043$

$36.043 < 38 < 44$

$\therefore$ 2 $\triangle$'s

11

7



$\frac{\sin C}{44} = \frac{\sin 55}{38}$

$C = \sin^{-1}\left(\frac{44 \sin 55}{38}\right)$

$\boxed{C_1 = 71.530°}$

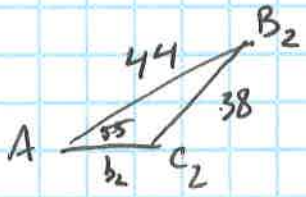
$B_1 = 180 - (71.530 + 55)$

$\boxed{B_1 = 53.47°}$

$\frac{b_1}{\sin 53.47} = \frac{38}{\sin 55}$

$b_1 = \frac{38 \sin 53.47}{\sin 55}$

$\boxed{b_1 = 37.276}$



$C_2 = 180° - 71.530°$

$\boxed{C_2 = 108.47°}$

$B_2 = 180 - (108.47 + 55)$

$\boxed{B_2 = 16.53°}$

$\frac{b_2}{\sin 16.53} = \frac{38}{\sin 55}$

$b_2 = \frac{38 \sin 16.53}{\sin 55}$

$\boxed{b_2 = 13.199}$