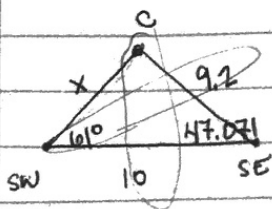


### 3.4 Applications of Sine and Cosine Laws

1.



$$\frac{\sin C}{10} = \frac{\sin 61}{9.2}$$

$$C = \sin^{-1}\left(\frac{10 \sin 61}{9.2}\right)$$

$$C = 71.929$$

$$\frac{x}{\sin 47.071} = \frac{9.2}{\sin 61}$$

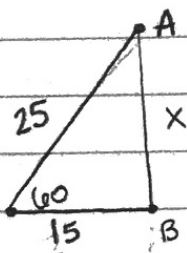
$$x = \frac{9.2 \sin 47.071}{\sin 61}$$

$$x = 7.70 \text{ km}$$

A. The SW ranger is closer

B.  $9.2 - 7.7 = 1.5 \text{ km}$

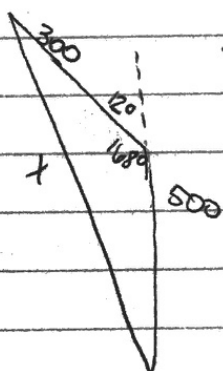
2.



$$x^2 = 15^2 + 25^2 - 2(15)(25) \cos 60$$

$$x = \boxed{21.794 \text{ km}}$$

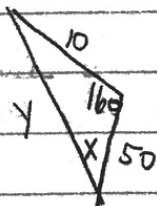
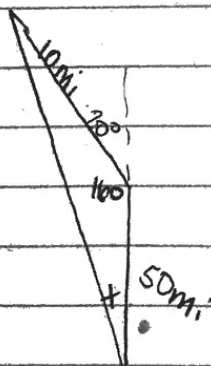
3.



$$x^2 = 500^2 + 300^2 - 2 \cdot 500 \cdot 300 \cos 168$$

$$x = \boxed{795.892 \text{ miles}}$$

\*4.



$$y^2 = 10^2 + 50^2 - 2(10)(50) \cos 120$$

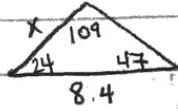
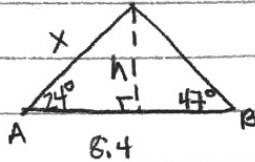
$$y = 59.4953$$

$$\frac{\sin X}{10} = \frac{\sin 120}{59.4953}$$

$$X = \sin^{-1}\left(\frac{10 \sin 120}{59.4953}\right)$$

$$X = \boxed{3.30^\circ}$$

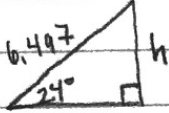
5.



$$\frac{x}{\sin 47} = \frac{8.4}{\sin 109}$$

$$x = \frac{8.4 \sin 47}{\sin 109}$$

$$x = 6.497$$

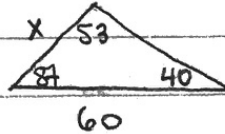
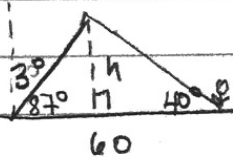


$$\sin 24 = \frac{h}{6.497}$$

$$h = 6.497 \sin 24$$

$$h = 2.64 \text{ miles}$$

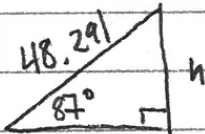
6.



$$\frac{x}{\sin 40} = \frac{60}{\sin 53}$$

$$x = \frac{60 \sin 40}{\sin 53}$$

$$x = 48.291$$

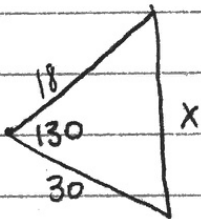


$$\sin 87^\circ = \frac{h}{48.291}$$

$$h = 48.291 \sin 87$$

$$h = 48.23 \text{ ft}$$

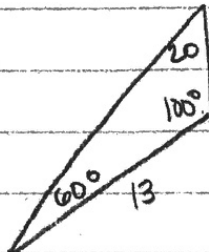
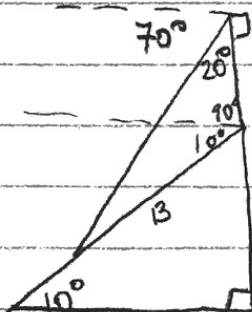
7.



$$x^2 = 18^2 + 30^2 - 2(18)(30)\cos 130$$

$$x = 43.80 \text{ miles}$$

8.



$$\frac{x}{\sin 60} = \frac{13}{\sin 20}$$

$$x = \frac{13 \sin 60}{\sin 20}$$

$$x = 32.92 \text{ ft}$$