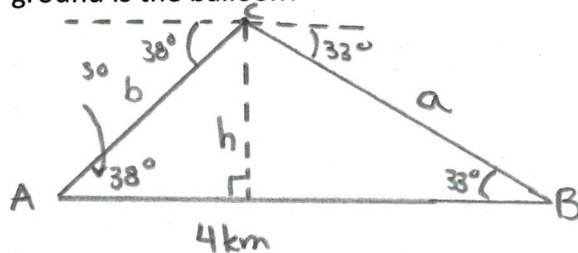## Section 7.7 – Practice Questions

1. A hot air balloon is flying directly between two cities that are $4km$ apart. The balloonist finds that the angle of depression to one city is $38°$ and $33°$ to the other city. How high above the ground is the balloon?

$\angle C = 180 - 38 - 33$

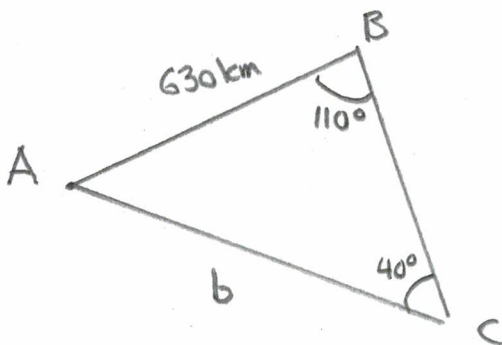$\boxed{\angle C = 109°}$

$\dfrac{a}{\sin 38} = \dfrac{4}{\sin 109}$

$a = 2.6$

$\sin 33 = \dfrac{h}{2.6}$

$2.6 \sin 33 = h$

$\boxed{h = 1.42 km}$

2. Two planes leave airport A at the same time in different directions. One plane lands at airport B, $630km$ from airport A. The other plane lands at airport C some time later. If the $\angle ABC = 110°$ and $\angle ACB = 40°$, how far did the second plane fly.

$\dfrac{b}{\sin 110} = \dfrac{630}{\sin 40}$

$\boxed{b = 921 km}$

Adrian Herlaar, School District 61   www.mrherlaar.weebly.com

3. Two planes leave Victoria at 9 *am*. One plane travels due east at $500 km/h$, while the other plane travels $640 km/h$ $N30°W$. How far apart are the two planes at noon?

NORTH

N30W   30° west of north

1920

120°

East
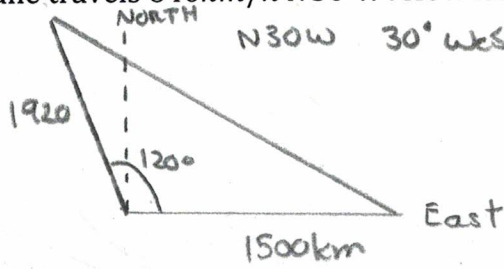
1500km

noon to 9am is 3hours

$\frac{500 km}{k} \cdot 3 hours = 1500 km$

$\frac{640 km}{k} \cdot 3k = 1920 km$

$\boxed{C = 2969.2 \, km}$

cosine law

$c^2 = 1920^2 + 1500^2 - 2(1920)(1500)\cos 120°$ $c^2 = 8\,816\,400$

4. In our solar system, the distance from the Sun (S) to planets A and B are 85 and 61 million miles respectively. When $\angle A = 20°$, how far is it from planet A to planet B and B'?
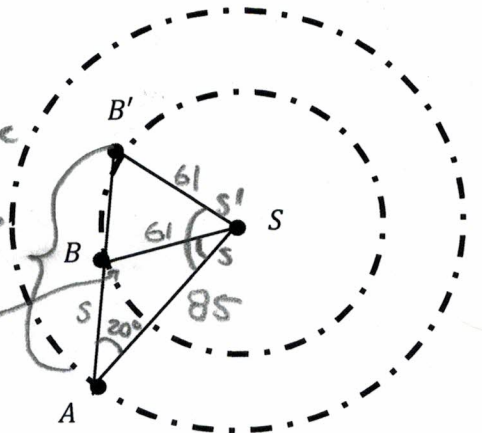
For $\angle B$ $\dfrac{\sin B}{85\,000\,000} = \dfrac{\sin 20}{61\,000\,000}$

$\angle B = 28.5° \rightarrow$ since this is acute it represents $B' = 28.5°$

$\angle S' = 180 - 20 - 28.5$

$= 131.5°$

$\angle B = 180 - 28.5 = 151.5°$

$\angle S = 8.5°$

B'

61

S'

S

61

B

S

85

S

$20°$

A

$\dfrac{S}{\sin 8.5} = \dfrac{61\,000\,000}{\sin 20}$

S or $\overline{AB} = 26\,362\,114.21$

or

$\boxed{26.4 \text{ million miles}}$

$\dfrac{\overline{AB'}}{\sin 131.5} = \dfrac{61\,000\,000}{\sin 20}$

$\overline{AB} = 133\,577\,802$

or

$\boxed{133.6 \text{ million miles}}$

Answer Key – 7.7

1.	$1.42km$
2.	$921km$
3.	$2969.2km$
4.	$AB' = 133.6\ million\ miles;\ AB = 26.4\ million\ miles$