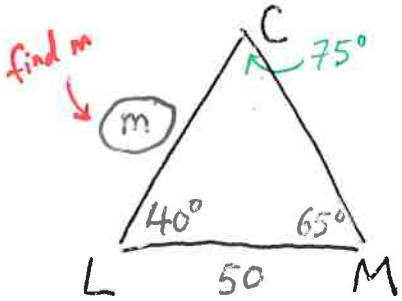
Key

Accel Pre-Calc Unit 3 Test Review Word Problems Review WS #2

1)

Two lookout towers, L and M, are 50 kilometers apart. The ranger in Tower L sees a fire at point C such that $m\angle CLM = 40°$. The ranger in Tower M sees the same fire such that $m\angle CML = 65°$. How far is the fire from Tower L?



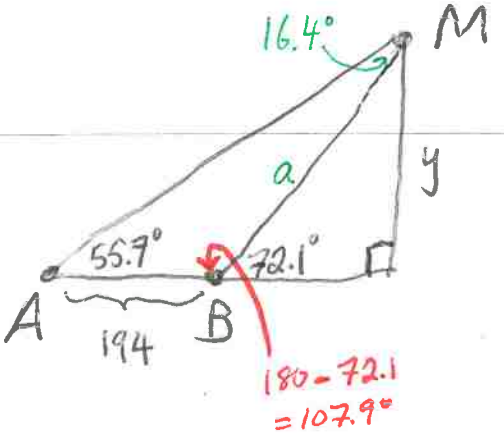
*Apply Law of Sine

$$\frac{m}{\sin 65} = \frac{50}{\sin 75}$$

$$m = \frac{50\sin 65}{\sin 75}$$

$m = 46.914$ Km

2) To measure the height of the Mathtastic Building, a person stands away from the base and measures the angle of elevation to the top of the building to be 55.7°. Moving 194 feet closer, the angle of elevation to the top of the building is 72.1°. How tall is the Mathtastic Building?

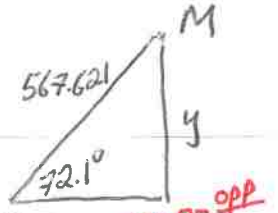


*Law of sines

$$\frac{a}{\sin 55.7} = \frac{194}{\sin 16.4}$$

$$a = \frac{194\sin 55.7}{\sin 16.4}$$

$a = 567.621$



$\sin\theta = \frac{opp}{hyp}$

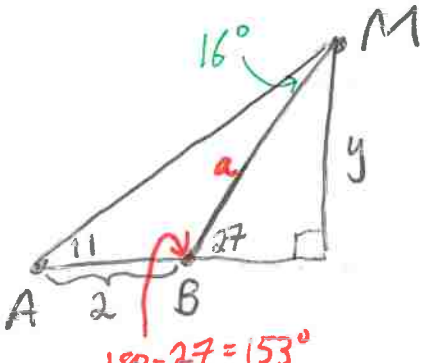
$$\sin 72.1 = \frac{y}{567.621}$$

$y = 567.621\sin 72.1$

$y = 540.145$ ft

3)

While driving on a horizontal road, you see a mountain on the horizon. You measure the angle of elevation to the peak of the mountain to be 11°. You then drive 2 km toward the mountain and find the angle of elevation to the peak of the mountain to have increased to 27°. How tall is the mountain?

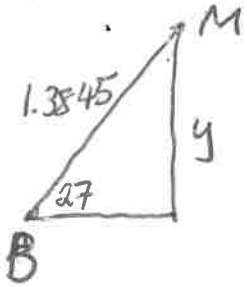


*Law of Sines

$$\frac{a}{\sin 11} = \frac{2}{\sin 16}$$

$$a = \frac{2\sin 11}{\sin 16}$$

$a = 1.3845$



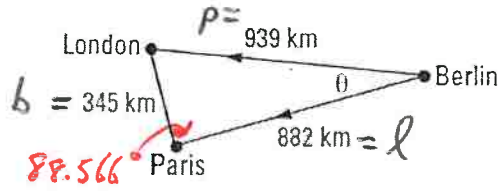
$\sin\theta = \frac{opp}{hyp}$

$$\sin 27 = \frac{y}{1.3845}$$

$y = 1.3845\sin 27$

$y = 0.628$ Km

4) a) Two airplanes leave Berlin, one heading straight for London and the other straight for Paris. Use the Law of Cosines to estimate the measure of the angle, θ, they will form.



b) Find the area of the triangle

a) *Find largest angle first (angle P)

$p^2 = \ell^2 + b^2 - 2b\ell\cos(P)$

$939^2 = 882^2 + 345^2 - 2(345)(882)\cos P$

$-882^2 \quad -345^2$

$\frac{-15228}{-608580} = \frac{-608580\cos P}{-608580}$

$0.0250 = \cos P$

$P = \cos^{-1}(0.0250) = 88.566°$

$\frac{\sin B}{345} = \frac{\sin 88.566}{939}$

$\sin B = \frac{345\sin 88.566}{939}$

$B = \sin^{-1}(0.36729) = \boxed{21.549°}$

b) $s = \frac{1}{2}(b+p+\ell)$

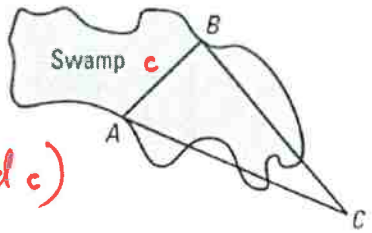
$s = \frac{1}{2}(939+345+882) = 1083$

$Area = \sqrt{1083(1083-939)(1083-882)(1083-345)}$

$\boxed{Area = 152{,}097.363\ km^2}$

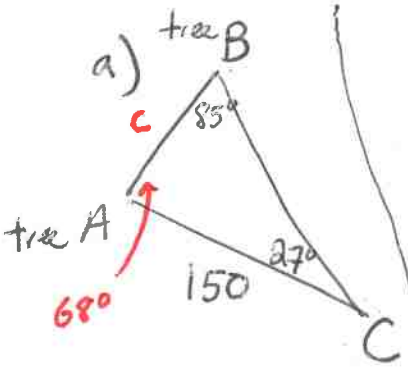
5) a)

Some students in Precalculus are assigned the task of measuring the distance between two trees separated by a swamp. The students determine that the angle formed by tree A, a dry point C, and tree B is 27°. They also know that m∠ABC is 85°. If AC is 150 ft, how far apart are the trees? (find c)



b) Find the area of the triangle

a)



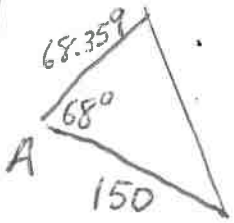
*Law of Sine

$\frac{c}{\sin 27} = \frac{150}{\sin 85}$

$c = \frac{150\sin 27}{\sin 85}$

$\boxed{c = 68.359\ ft.}$

b) Area → (SAS)



$Area = \frac{1}{2}bc\sin A$

$Area = \frac{1}{2}(68.359)(150)\sin 68$

$\boxed{Area = 4753.602\ ft^2}$