MBF3C
Trigonometry Test (PM ver.)

Name: Solns

Preparation Checklist:

I missed classes this unit:	Many ☐	Some ☐	Few ☐	None ☐
I did my homework regularly:	No ☐	Some ☐	Most ☐	All ☐
I studied _____ hours for this **Test.**				
I took advantage of extra help offered:	No ☐	Some ☐	Yes ☐	
I have my calculator/pencils/materials	No ☐	Yes ☐		
My Goal for this task is to achieve a Level _____				

Specific Curriculum Expectations	**Content**	**Communication Level**	**Overall Level**
GT2: Solve problems involving trigonometry in acute triangles using the sine law and the cosine law, including problems arising from real-world applications.	/32		

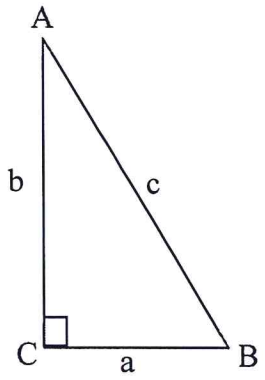
Formulas: SOH CAH TOA $a^2 + b^2 = c^2$ $\cos A = \dfrac{b^2 + c^2 - a^2}{2bc}$

Sine Law: $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$ Cosine Law: $c^2 = a^2 + b^2 - 2(a)(b)\cos C$

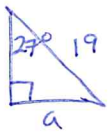
*** Round all angles to the nearest degree and all lengths to the nearest tenth***
Make a drawing of the triangles when one isn't provided

PART A :

1. Given ΔABC for each… [6 marks]



(a) $\angle A = 27°$, c = 19 *m* → find a



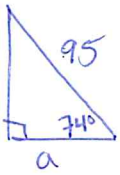
$\sin\theta = \frac{o}{h}$

$\sin 27° = \frac{a}{19}$

$a = 19 \cdot \sin 27°$

$a \doteq 8.6\,cm$

(b) $\angle B = 74°$, c = 95 *cm* → find a



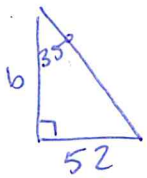
$\cos\theta = \frac{a}{h}$

$\cos 74° = \frac{a}{95}$

$a = 95 \cdot \cos 74°$

$a \doteq 26.2\,cm$

(c) $\angle A = 35°$, a = 52 *m* → find b



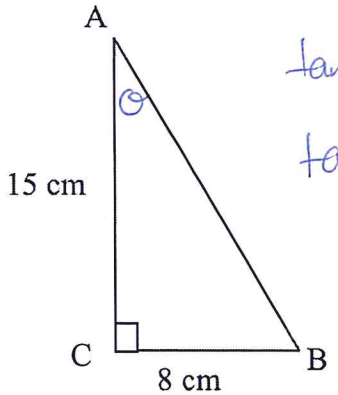
$\tan\theta = \frac{o}{a}$

$\tan 35° = \frac{52}{b}$

$b = \frac{52}{\tan 35°}$

$b \doteq 74.3\,cm$

2. Solve for angle $\angle A$. Show your work. [2 marks]



$\tan\theta = \frac{o}{a}$

$\tan\theta = \frac{8}{15}$

$\theta \doteq 28°$

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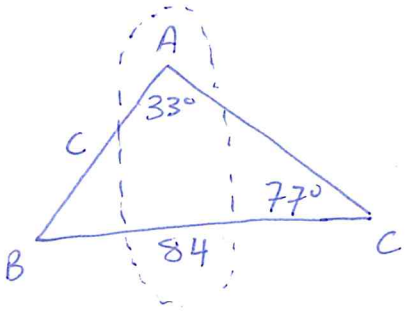
3. In ΔABC $\angle A = 33°, \angle C = 77°, a = 84cm$. Find the length of side c. Draw it first! [4 marks]



$$\frac{c}{\sin C} = \frac{a}{\sin A}$$

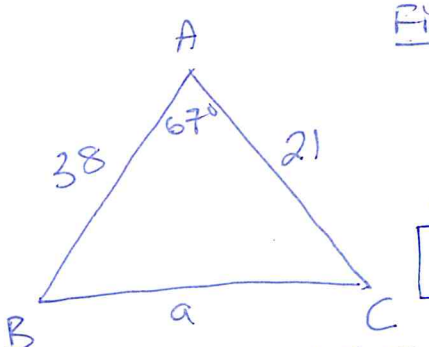
$$\frac{c}{\sin 77°} = \frac{84}{\sin 33°}$$

$$c = \sin 77° \cdot \frac{84}{\sin 33°}$$

$$c \doteq 150.3cm$$

PART B: Application

4. In ΔABC if $\angle A = 67°$, $b = 21cm$, $c = 38cm$. Find the length of a then find $\angle B$. Draw it first! [4 marks]



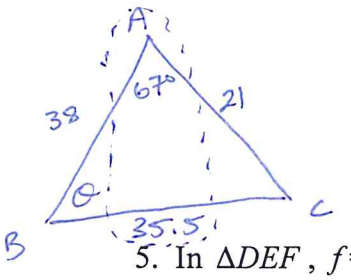
Find a

$$a^2 = b^2 + c^2 - 2bc\cos A$$

$$a^2 = 21^2 + 38^2 - 2(21)(38)\cos 67°$$

$$a^2 = 1261.39$$

$$a \doteq 35.5\ cm$$



Find $\angle B$

$$\frac{\sin B}{b} = \frac{\sin A}{a}$$

$$\frac{\sin B}{21} = \frac{\sin 67°}{35.5}$$

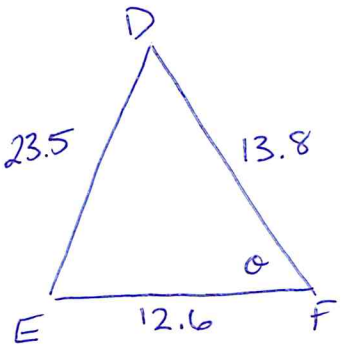
$$\sin B = 21 \cdot \frac{\sin 67°}{35.5}$$

$$\sin B = 0.5445$$

$$B = \sin^{-1}(0.5445)$$

$$B \doteq 33°$$

5. In ΔDEF , $f = 23.5$ cm, $d = 12.6$ cm, $e = 13.8$ cm. Find $\angle F$. Draw it first! [4 marks]



$$\cos F = \frac{e^2 + d^2 - f^2}{2ed}$$

$$\cos F = \frac{13.8^2 + 12.6^2 - 23.5^2}{2(13.8)(12.6)}$$

$$\cos F = \frac{-203.05}{347.76}$$

$$F = \cos^{-1}\left(\frac{-203.05}{347.76}\right)$$

$$F \doteq 126°$$

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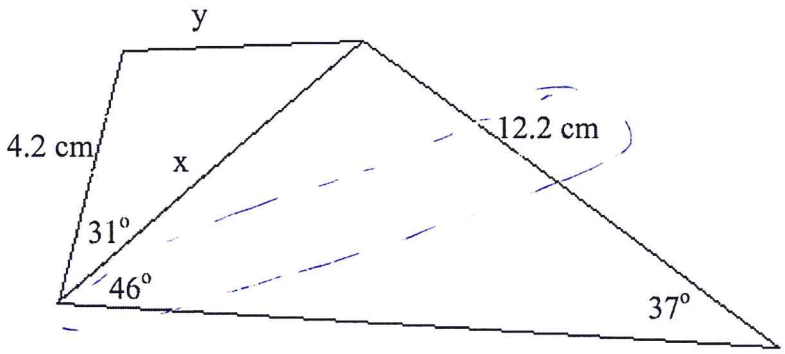
PART C:

6. Determine the values of x and y. Drawing is not to scale. [6 marks]



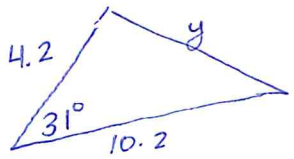
Find x

$$\frac{x}{\sin 37^\circ} = \frac{12.2}{\sin 46^\circ}$$

$$x = \sin 37^\circ \cdot \frac{12.2}{\sin 46^\circ}$$

$$\boxed{x \doteq 10.2 \text{ cm}}$$

Find y



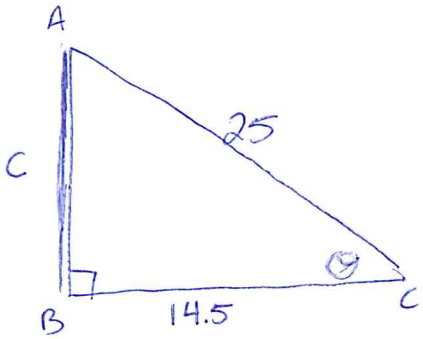
$$y^2 = 4.2^2 + 10.2^2 - 2(4.2)(10.2)\cos 31^\circ$$

$$y^2 \doteq 48.24$$

$$\boxed{y \doteq 6.9 \text{ cm}}$$

7. The foot of a flag pole is 14.5 m from where Silvia stands. Silvia is anchoring a 25m rope into the ground where she stands which runs straight to the top of the flag pole to help support it.

   a) **Draw the diagram, label** it and **determine the angle of elevation** to the top of the flag pole. [4 marks]



$$\cos\theta = \frac{a}{h}$$

$$\cos\theta = \frac{14.5}{25}$$

$$\theta = \cos^{-1}\left(\frac{14.5}{25}\right)$$

$$\boxed{\theta \doteq 55^\circ}$$

   b) How tall is the flag pole? [2 marks]

Pythagorus

$$b^2 = a^2 + c^2$$

$$c^2 = b^2 - a^2$$

$$c^2 = 25^2 - 14.5^2$$

$$c^2 \doteq 414.75$$

$$c \doteq 20.4$$

$\therefore$ height is 20.4m