

What I will give you:

Area of triangle:

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

and

Heron's formula for the area of a triangle:

$$\text{Area} = \sqrt{s(s-a)(s-b)(s-c)}$$

$$\text{where } s = \frac{a+b+c}{2}$$

What you need to memorize:

Law of Sines – used with AAS, ASA, and SSA:

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

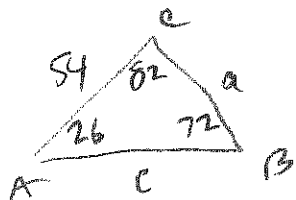
and

Law of Cosines – used with SAS & SSS

$$c^2 = a^2 + b^2 - 2ab\cos C$$

Solve the following triangles using the Law of Sines or the Law of Cosines:

1. $\angle B = 72^\circ$, $\angle C = 82^\circ$, $b = 54$



$$A = 180 - 82 - 72 = 26^\circ$$

$$\frac{a}{\sin 26^\circ} = \frac{54}{\sin 72^\circ}$$

$$a = \sin 26^\circ \left(\frac{54}{\sin 72^\circ} \right)$$

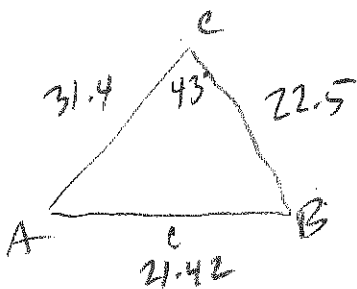
$$\approx 24.89$$

$$\frac{c}{\sin 82^\circ} = \frac{54}{\sin 72^\circ}$$

$$c = \sin 82^\circ \left(\frac{54}{\sin 72^\circ} \right)$$

$$\approx 56.23$$

2. $\angle C = 43^\circ$, $a = 22.5$, $b = 31.4$



$$c^2 = 31.4^2 + 22.5^2 - 2(31.4)(22.5)\cos 43^\circ$$

$$\approx 458.87$$

$$\Rightarrow c \approx 21.42$$

$$\frac{\sin A}{22.5} = \frac{\sin 43^\circ}{21.42}$$

$$\sin A = 22.5 \left(\frac{\sin 43^\circ}{21.42} \right)$$

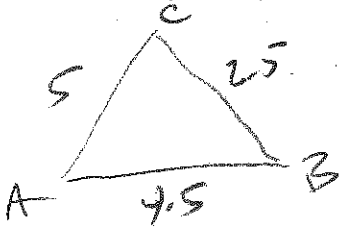
$$\approx 0.7164$$

$$A \approx 45.76^\circ$$

$$\Rightarrow B = 180 - 43 - 45.76 = 91.24^\circ$$

Sections 6.1 & 6.2 - I.C.E.

3. $a=2.5$, $b=5$, $c=4.5$



$$\cos A = \frac{2.5^2 + 5^2 - 4.5^2}{2(5)(2.5)} \approx .8667$$

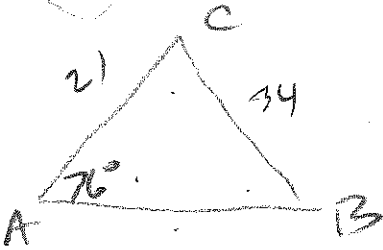
$$A \approx 29.93^\circ$$

$$\frac{\sin B}{5} = \frac{\sin 29.93^\circ}{2.5}$$

$$\sin B = 5 \left(\frac{\sin 29.93^\circ}{2.5} \right) \approx .9978$$

$$B \approx 86.18^\circ \Rightarrow C \approx 63.89^\circ$$

4. $\angle A = 76^\circ$, $a=34$, $b=21$



$$\frac{\sin B}{21} = \frac{\sin 76^\circ}{34}$$

$$\sin B = 21 \left(\frac{\sin 76^\circ}{34} \right) \approx .5993$$

$$\frac{c}{\sin 67.18^\circ} = \frac{34}{\sin 76^\circ}$$

$$c \approx 32.30$$

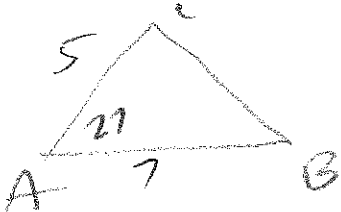
$$\Rightarrow B \approx 36.82^\circ$$

$$\Rightarrow C = 180 - 76 - 36.82 = 67.18^\circ$$

or $B = 143.18^\circ$
impossible!!

Use the information given to find the AREA of the triangle:

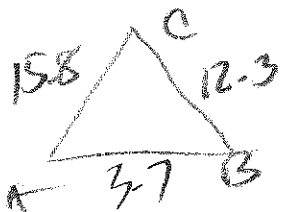
5. $\angle A = 27^\circ$, $b=5$, $c=7$



$$A = \frac{1}{2}(5)(7)(\sin 27^\circ)$$

$$\approx 7.95 \text{ u}^2$$

6. $a=12.3$, $b=15.8$, $c=3.7$



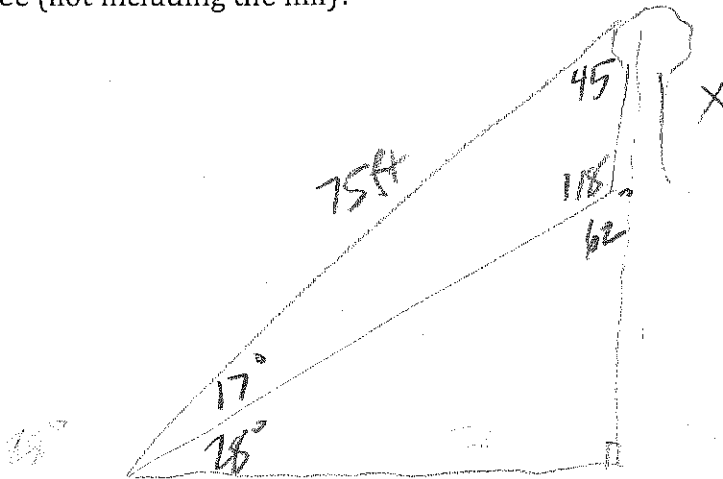
$$s = \frac{15.8 + 12.3 + 3.7}{2} = 15.9$$

$$A = \sqrt{15.9(15.9-15.8)(15.9+2.3)(15.9-3.7)}$$

$$= \sqrt{15.9(.1)(3.6)(12.2)} \approx 8.36 \text{ u}^2$$

Sections 6.1 & 6.2 - I.C.E.

7. A tree stands on a hillside of slope 28° (from the horizontal). From a point 75 feet away from the top of the tree, the angle of elevation to the top of the tree is 45° . What is the height of the tree (not including the hill)?



$$\frac{X}{\sin 17^\circ} = \frac{75}{\sin 118^\circ}$$

$$X = \sin 17^\circ \left(\frac{75}{\sin 118^\circ} \right) \approx 24.83 \text{ ft}$$