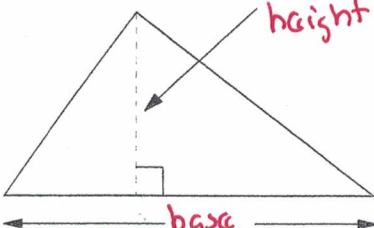
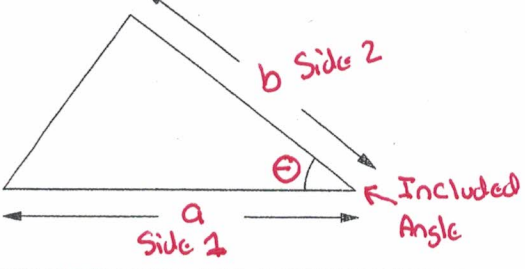
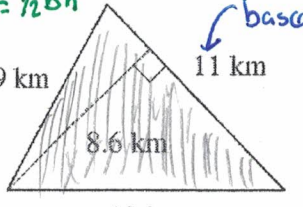
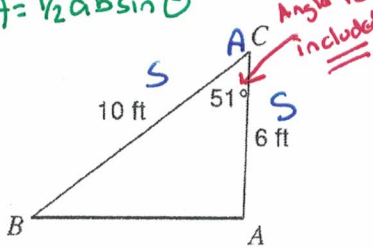
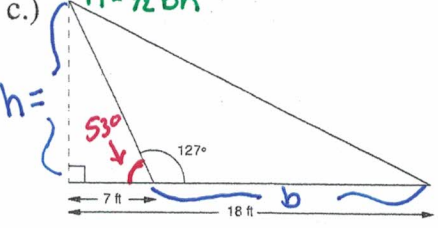


7.3 – Area of a Triangle: Using Two Different Formulas

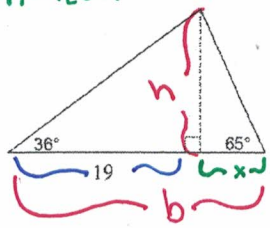
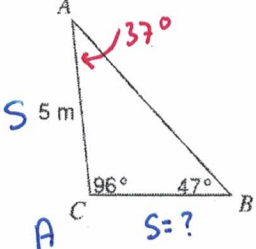
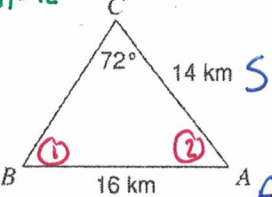
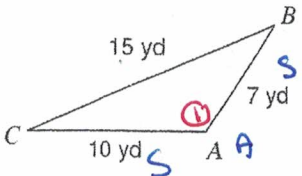
Area of a Triangle Formula # 1	Area of a Triangle Formula # 2
Area = $\frac{1}{2}(\text{base})(\text{height})$ or $A = \frac{1}{2}bh$ where given Δ has a <u>right \angle</u>	Area = $\frac{1}{2}(\text{side 1})(\text{side 2})\sin\theta$ or $A = \frac{1}{2}ab\sin\theta$ where given Δ is <u>SAS</u>
 <p style="text-align: center;">(The oblique Δ contains a right \angle)</p>	

Example 1 – Simple (One to Two Steps): Find the area of the triangle. Round to tenth place.

<p>a.) $A = \frac{1}{2}bh$</p>  <p>$b = 12$ $h = 8.6$</p> <p>$A = \frac{1}{2}(12)(8.6)$</p> <p style="border: 1px solid black; border-radius: 15px; padding: 5px; display: inline-block;">$A = 51.6 \text{ km}^2$</p>	<p>b.) $A = \frac{1}{2}ab\sin\theta$</p>  <p>$A = \frac{1}{2}(10)(6)\sin 51^\circ$</p> <p style="border: 1px solid black; border-radius: 15px; padding: 5px; display: inline-block;">$A = 23.3 \text{ ft}^2$</p>	<p>c.) $A = \frac{1}{2}bh$</p>  <p>$h = ?$ $b = 18 - 7 = 11 \text{ ft}$</p> <p>① Find h $\tan 53^\circ = \frac{h}{7}$ $h = 9.3 \text{ ft}$</p> <p>② Find Area $A = \frac{1}{2}(11)(9.3) \rightarrow \boxed{51.2 \text{ ft}^2}$</p>
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* If no units are given, you must write units in your answer! *

Example 2 – Complex (More than Two Steps): Find the area of the triangle. Round to tenth place.

<p>a.) $A = \frac{1}{2}bh$</p>  <p>$h = ?$ $b = 19 + x$</p> <p>① Find h $\tan 36^\circ = \frac{h}{19}$ $h = 13.8$</p> <p>② Find x $\tan 65^\circ = \frac{13.8}{x}$ $x = 6.4$</p> <p>③ Find b $b = 19 + 6.4 \rightarrow b = 25.4$</p> <p>④ $A = \frac{1}{2}(25.4)(13.8)$</p> <p style="border: 1px solid black; border-radius: 15px; padding: 5px; display: inline-block;">$A = 175.3 \text{ units}^2$</p>	<p>b.) $A = \frac{1}{2}ab\sin\theta$</p>  <p>① Find $\angle A$ $A = 180 - (96 + 47)$ $A = 37^\circ$</p> <p>② Find a using Law of Sines $\frac{a}{\sin 37^\circ} = \frac{5}{\sin 47^\circ}$ $a = 4.1$</p> <p>③ $A = \frac{1}{2}(4.1)(5)\sin 96^\circ$</p> <p style="border: 1px solid black; border-radius: 15px; padding: 5px; display: inline-block;">$A = 10.2 \text{ m}^2$</p>	<p>c.) $A = \frac{1}{2}ab\sin\theta$</p>  <p>① Find $\angle B$ using Law of Sines $\frac{14}{\sin B} = \frac{16}{\sin 72^\circ}$ $B = 56.3^\circ$</p> <p>② Find A $A = 180 - (72 + 56.3)$ $A = 51.7^\circ$</p> <p>③ $A = \frac{1}{2}(14)(16)\sin 51.7^\circ$</p> <p style="border: 1px solid black; border-radius: 15px; padding: 5px; display: inline-block;">$A = 87.9 \text{ km}^2$</p>	<p>d.) $A = \frac{1}{2}ab\sin\theta$</p>  <p>① Find $\angle A$ using Law of Cosines $(15)^2 = (10)^2 + (7)^2 - 2(10)(7)\cos A$ $225 = 149 - 140\cos A$ $76 = -140\cos A$ $\cos A = \frac{76}{-140}$ $A = 122.9^\circ$</p> <p>② $A = \frac{1}{2}(10)(7)\sin 122.9^\circ$</p> <p style="border: 1px solid black; border-radius: 15px; padding: 5px; display: inline-block;">$A = 29.4 \text{ yd}^2$</p>
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