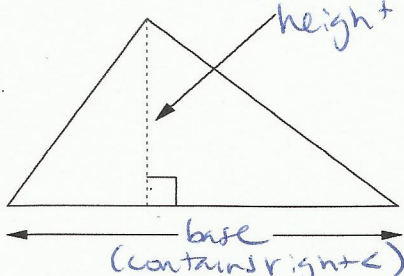
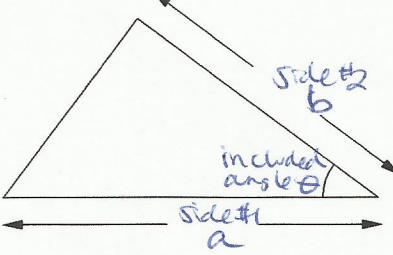
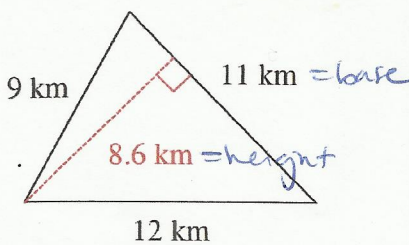


7.3 – Area of a Triangle: Using Two Different Formulas

Area of a Triangle Formula # 1	Area of a Triangle Formula # 2
<p>Area = $\frac{1}{2} \cdot \text{base} \cdot \text{height}$ or $A = \frac{1}{2} b \cdot h$</p> <p>where given Δ has a <u>right \angle</u></p> 	<p>Area = $\frac{1}{2} \cdot \text{side} \# 1 \cdot \text{side} \# 2 \sin(\text{included angle})$ or $A = \frac{1}{2} ab \sin \theta$</p> <p>where given Δ is <u>SAS Δ</u></p> 

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

a.)



9 km

11 km = base

8.6 km = height

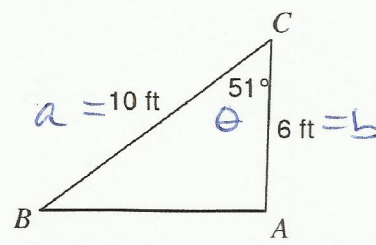
12 km

$A = \frac{1}{2} b \cdot h$

$A = \frac{1}{2} (11)(8.6)$

$A = 47.3 \text{ km}^2$

b.)



$a = 10 \text{ ft}$

51°

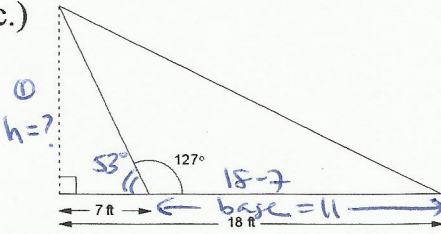
$6 \text{ ft} = b$

$A = \frac{1}{2} ab \sin \theta$

$A = \frac{1}{2} (10)(6) \sin 51$

$A = 23.3 \text{ ft}^2$

c.)



$h = ?$

53°

127°

18 ft

base = 11

① $\tan 53 = \frac{h}{7}$

$h = 7 \tan 53 \rightarrow h = 9.3$

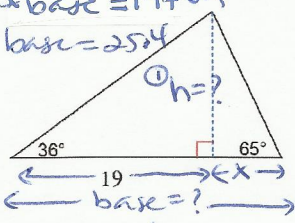
② $A = \frac{1}{2} b \cdot h$

$A = \frac{1}{2} (11)(9.3)$

$A = 51.2 \text{ ft}^2$

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

a.)



base = 19 + 6.4

base = 25.4

$h = ?$

① $\tan 36 = \frac{h}{19}$

$h = 19 \tan 36 \rightarrow h = 13.8$

② $\tan 65 = \frac{13.8}{x}$

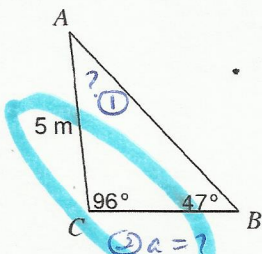
$x = \frac{13.8}{\tan 65} \rightarrow x = 6.4$

③ $A = \frac{1}{2} b h$

$A = \frac{1}{2} (25.4)(13.8)$

$A = 175.3 \text{ units}^2$

b.)



5 m

96°

47°

① $A = 180 - 96 - 47$

$A = 37^\circ$

② $\frac{5}{\sin 47} = \frac{a}{\sin 37}$

$\frac{a \sin 47}{\sin 47} = \frac{5 \sin 37}{\sin 47}$

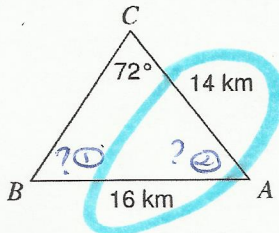
$a = 4.1$

③ $A = \frac{1}{2} ab \sin \theta$

$A = \frac{1}{2} (5)(4.1) \sin 96$

$A = 10.2 \text{ m}^2$

c.)



72°

14 km

16 km

① $\frac{16}{\sin 72} = \frac{14}{\sin B}$

$\frac{16 \sin B}{16} = \frac{14 \sin 72}{16}$

$B = \sin^{-1} \left(\frac{14 \sin 72}{16} \right)$

$B = 56.3^\circ$

② $A = 180 - 72 - 56.3$

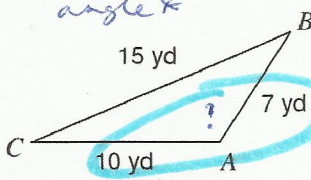
$A = 51.7^\circ$

③ $A = \frac{1}{2} ab \sin \theta$

$A = \frac{1}{2} (16)(14) \sin 51.7$

$A = 87.9 \text{ km}^2$

d.)



15 yd

10 yd

7 yd

* Find largest angle $\angle C$

① $15^2 = 10^2 + 7^2 - 2(10)(7) \cos A$

$225 = 149 - 140 \cos A$

$76 = -140 \cos A$

$A = \cos^{-1} \left(\frac{-76}{140} \right)$

$A = 122.9^\circ$

② $A = \frac{1}{2} ab \sin \theta$

$A = \frac{1}{2} (10)(7) \sin 122.9$

$A = 29.4 \text{ yd}^2$