Alg. 2 – BE | THURSDAY 1-14-10

SOLVE USING THE QUADRATIC FORMULA:

(1) $x^2 - 21.8x + 96 = 0$

(NEED A CALCULATOR)

$a = 1$

$b = -21.8$

$c = 96$

$b^2 - 4ac$

$(-21.8)^2 - 4(1)(96)$

$475.24 - 384$

$d = 91.2$

$$x = \frac{-b \pm \sqrt{d}}{2a} = \frac{+21.8 \pm \sqrt{91.2}}{2(1)}$$

$$= \frac{21.8 \pm 9.5}{2}$$

$$\boxed{x = \{15.7, 6.2\}}$$

CK $(15.7)^2 - 21.8(15.7) + 96 \stackrel{?}{=} 0$

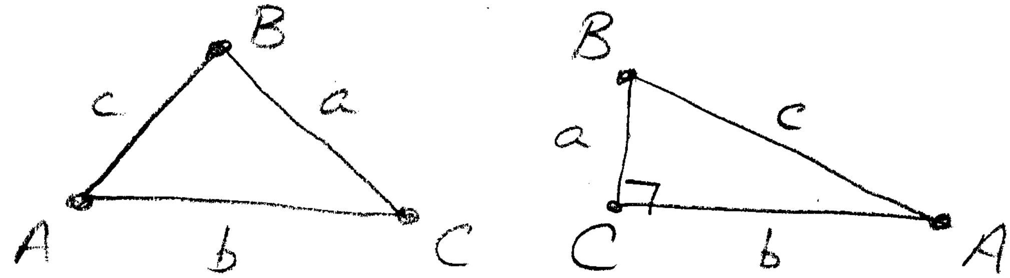
15.7 $0.23 \approx 0$ ✓

$(6.2)^2 - 21.8(6.2) + 96 \stackrel{?}{=} 0$

$-.72 \approx 0$ ✓

RECALL: the vocabulary for naming the sides (lower case a, b, c) and angles (upper case A, B, C)

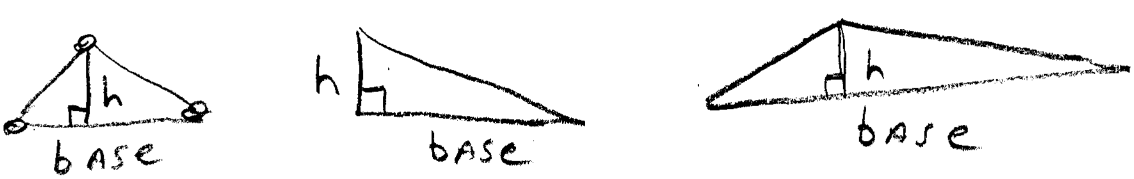
Ex



IN A right $\triangle$ Angle C is always the 90° angle, side c is always the hypotenuse.

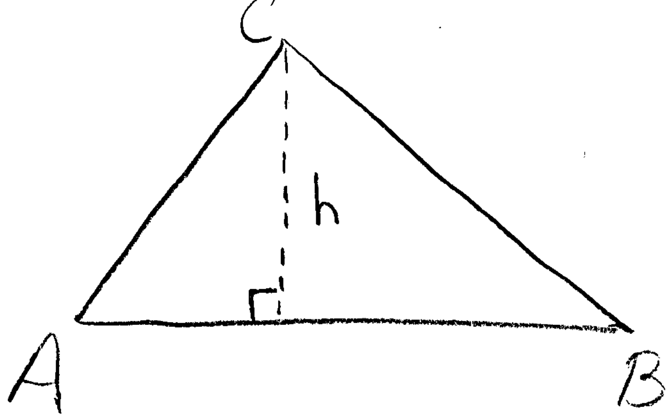
Recall: WHAT is the formula for the Area of any $\triangle$?

$$A_{\triangle} = \frac{1}{2} bh \text{ or } \frac{1}{2}(\text{base})(\text{height})$$



Lets extend $A = \frac{1}{2}bh$ by using a little trig.!

Take any $\triangle$, say $\triangle ABC$:



$$A = \frac{1}{2}(\overline{AB})(h)$$

But, $\sin A = \dfrac{h}{\overline{AC}}$ Solve for h

$$\overline{AC} \cdot \sin A = \frac{h}{\overline{AC}} \cdot \overline{AC}$$

$\overline{AC} \sin A = h$ Since $A = \frac{1}{2} b h$

SUBSTITUTE

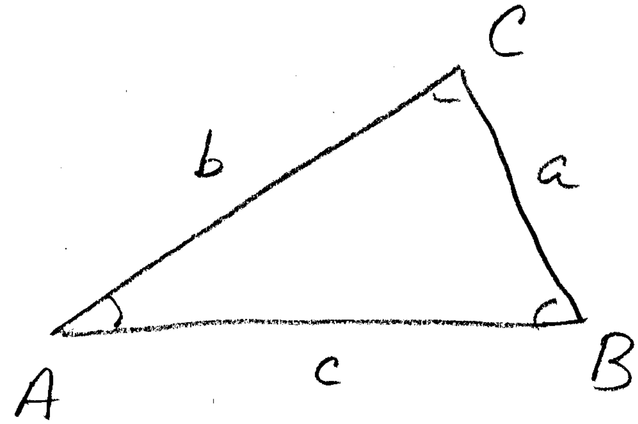
$$\boxed{A = \frac{1}{2}(\overline{AB})(\overline{AC}) \sin A}$$

* for Any triangle!

$A_\triangle$ = $\frac{1}{2}$ the product of the length of two sides times the sine of their included angle.

In terms of a, b, c, A, B, C:

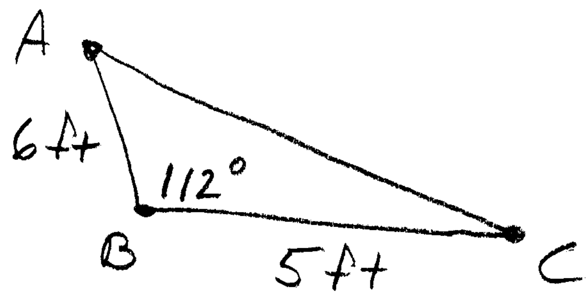
$$\boxed{\begin{aligned} A_\Delta &= \tfrac{1}{2} bc \sin A \\ &= \tfrac{1}{2} ac \sin B \\ &= \tfrac{1}{2} ab \sin C \end{aligned}}$$



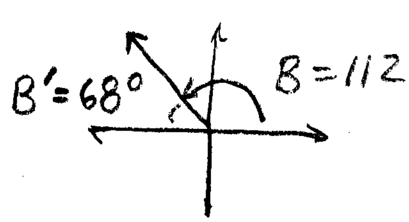
Did I mention this works for ANY Δ, not just right triangles.

EX 1
Pg 725

Find the area of ΔABC



$A_\Delta = \left(\frac{1}{2}\right)(6)(5) \sin 112°$



$= (15)(.9272)$

$= 13.908 = \boxed{13.9 \text{ ft}^2}$

*MUST HAVE UNITS!!

LETS use THE 3 different forms of the area of A Δ:

$$\frac{\frac{1}{2}bc\sin A}{\frac{1}{2}abc} = \frac{\frac{1}{2}ac\sin B}{\frac{1}{2}abc} = \frac{\frac{1}{2}ab\sin C}{\frac{1}{2}abc}$$

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

OR

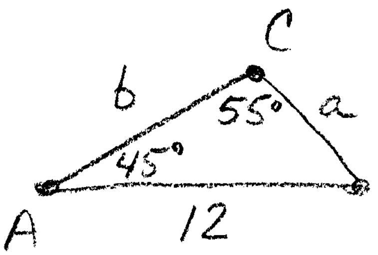
$$\boxed{\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}}$$

LAW OF SINES $\Rightarrow$ Ch. 13-4

* Use ANY two fractions in A "3 out of 4" problem

EX 2 Find a

pg 726

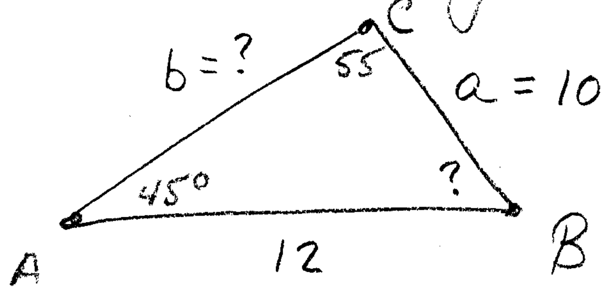


$$\frac{\sin 55^\circ}{12} = \frac{\sin 45^\circ}{a}$$

"3 of 4" ARE KNOWN: ASA

$$a = (\sin 45^\circ)\left(\frac{12}{\sin 55^\circ}\right) = (.7071)\left(\frac{12}{.8192}\right) \cong \boxed{10.4 \text{ UNITS}}$$

Ex 1 (Cont) How would you find B and b?



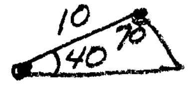
$$B = 180 - (55 + 45)$$
$$= 180 - 100 = \boxed{80° = B}$$

$$b \Rightarrow \quad \frac{\sin 55°}{12} = \frac{\sin 80°}{b} \qquad \text{"3 of 4"}$$

$$\therefore \; b = (\sin 80°)\left(\frac{12}{\sin 55°}\right)$$

$$b = (.9848)\left(\frac{12}{.8192}\right) \cong \boxed{14.4 \text{ units}}$$

If you know 2 Angles ⇒ ASA or AAS
use THe LOS

Ex 

Ex 

If you know 2 sides ⇒ SSS, SAS, *SSA
special
use THe LOC (later)

Homework: Pg. 730 #4–7.