# Section 6.2: cont'd

Monday, January 12, 2015
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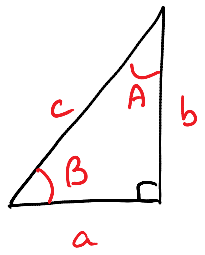
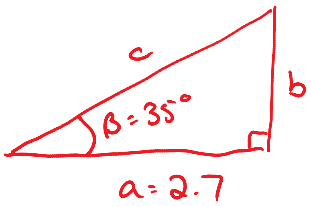
notation:




a is opposite to A
b B
c is the hypotenuse

example: solve the right triangle with $B = 35°$ and $a = 2.7$




$A = 90° - B = 55°$

$\tan B = \frac{b}{a}$

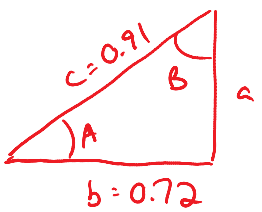
$b = a \tan B$
$= 2.7 \tan 35°$
$= 1.89056$
$= 1.9$

$\cos B = \frac{a}{c}$

$c = \frac{a}{\cos B}$
$= \frac{2.7}{\cos 35°} = 3.29609 = 3.3$

$A = 55°, \ b = 1.9, \ c = 3.3$

Solve the right triangle with $b = 0.72$ and $c = 0.91$
Round angles to the nearest integer.




$a^2 + b^2 = c^2$
$a^2 = c^2 - b^2$
$= 0.91^2 - 0.72^2$
$a = 0.5565$
$= 0.56$

$= 0.56$

$\cos A = \frac{b}{c} = \frac{0.72}{0.91}$

$A = \cos^{-1}\left(\frac{0.72}{0.91}\right)$ ← I usually skip this step

$= 37.7°$

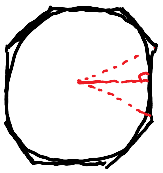
$= 38°$

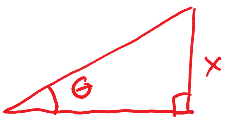
$B = 90° - A = 52°$

$a = 0.56$, $A = 38°$, $B = 52°$

word problem:

For a T-shirt design, a circle is inscribed inside a regular octagon, as shown in the diagram. (Regular polygons have all sides and all angles equal.) If the radius of the circle is 8.5 cm, what is the length of each of the octagon's sides?






with $\theta = \frac{360°}{16}$

$\theta = 22.5°$

$\tan\theta = \frac{x}{r}$

$x = r\tan\theta$

$= 8.5 \tan 22.5°$

$= 3.52$

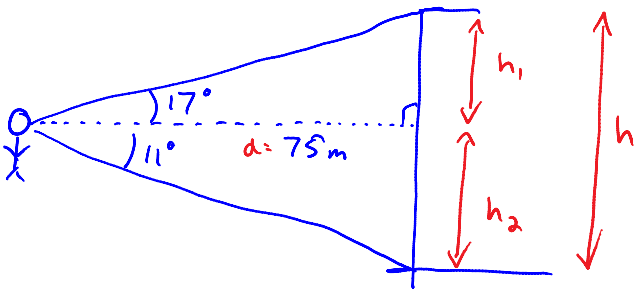
$\ell = 2x = 7.04$

$= 7.0$ cm

The length of the octagon's side is 7.0 cm.

example:

A window washer up on a ladder observes that, from his location, the angle of elevation to the top of a nearby building is 17° and the angle of depression to the bottom of that same building is 11°. If the horizontal distance between the window washer's ladder and the building is 75 m, what is the height of the nearby building?




$\tan 17° = \frac{h_1}{d}$

$h_1 = d \tan 17°$

$= 75 \tan 17°$

$\tan 11° = \frac{h_2}{d}$

$h_2 = d \tan 11°$

$= 75 \tan 11°$

$h = h_1 + h_2$

$= 75 \tan 17° + 75 \tan 11°$

$= 37.5 \text{ m}$

$= 38 \text{ m}$