Name: Date: Period: 1

Solving Right Triangles

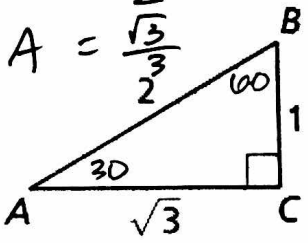
Lesson Objective: IWBAT ~~solve~~ find missing angle measures in right Δs.

SOH-CAH-TOA

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

$\cos A = \frac{\sqrt{3}}{2}$

$\tan A = \frac{\sqrt{3}}{3}$

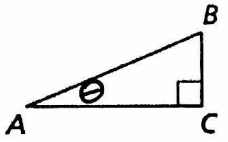


1. What type of triangle is ΔABC? How do you know?
   30-60-90... side lengths
2. Determine which of the two acute angles has a cosine of 0.5.
   ∠B ($\cos B = \frac{1}{2}$)
3. What must the measure of the angle from problem #2 be? Briefly explain your answer.
   $m\angle B = 60°$ ($m\angle B = \cos^{-1}\left(\frac{1}{2}\right) = 60°$)

Inverse Trigonometric Ratios

SOH-CAH-TOA

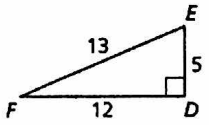
Let $\angle A$ be an acute angle in right ΔABC.



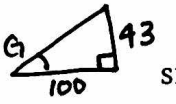
Inverse Tangent	*Inverse Sine*	*Inverse Cosine*
$\tan\theta = \frac{BC}{AC}$	$\sin\theta = \frac{BC}{AB}$	$\cos\theta = \frac{AC}{AB}$
$\theta = \tan^{-1}\left(\frac{BC}{AC}\right)$	$\theta = \sin^{-1}\left(\frac{BC}{AB}\right)$	$\theta = \cos^{-1}\left(\frac{AC}{AB}\right)$

Example:

4. Determine which of the acute angles has a sine ratio of $\frac{12}{13}$. Then, approximate that angle measure to the nearest hundredth.
   ∠E ; $m\angle E = \sin^{-1}\left(\frac{12}{13}\right) \approx 67.38°$



5. Let $\angle G$, $\angle H$ and $\angle K$ be acute angles. Use a calculator to approximate the measures of $\angle G$, $\angle H$ and $\angle K$ to the nearest hundredth of a degree.

   $\tan G = 0.43 = \frac{43}{100}$ 

   $\sin H = 0.68$ $\cos K = 0.94$

Solve $m\angle G \approx 23.27°$ $m\angle H \approx 42.84°$ $m\angle K \approx 19.95°$

Solve a Right Triangle: To solve a right triangle means to find ALL unknown side lengths and angle measures. You can solve a right triangle when you know either of the following:

1. 2 sides
2. 1 side & 1 ∠ measure

Example: SOH-CAH-TOA

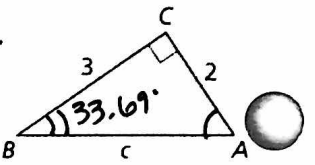
6. Solve the right triangle. Give answers in exact form, and also round them to the nearest hundredth.

$\tan B = \frac{2}{3}$

$m\angle B = \tan^{-1}\left(\frac{2}{3}\right)$

$m\angle B \approx 33.69°$

$m\angle A \approx 56.31°$ by Δ sum Thm



$\sin(33.69°) = \frac{2}{c}$

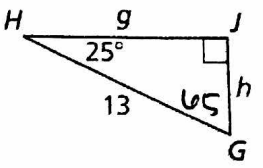
$\frac{0.5547}{1} = \frac{2}{c}$

$2 = 0.5547c$

$c = \frac{2}{0.5547}$ ≈ 3.61

7. Solve the right triangle. Give answers in exact form, and also round them to the nearest hundredth.

$m\angle G = 65°$ by Δ sum Thm



$\sin(25) = \frac{h}{13}$

$\frac{0.4226}{1} = \frac{h}{13}$

$h \approx (13)(0.4226)$

$h \approx 5.49$

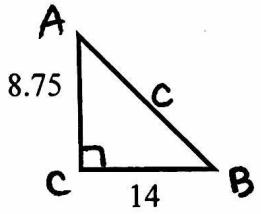
$\cos 25 = \frac{g}{13}$

$\frac{0.9063}{1} = \frac{g}{13}$

$g = (13)(0.9063)$

$g \approx 11.78$

8. Solve the triangle. Round to hundredth.



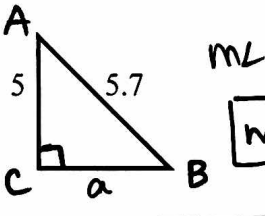
$m\angle A = \tan^{-1}\left(\frac{14}{8.75}\right)$

$m\angle A \approx 57.99°$

$m\angle B \approx 32.01°$ by Δ sum Thm

$\cos(32.01) = \frac{14}{c} \rightarrow c \approx \frac{14}{0.8480}$ ≈ 16.51

10. Solve the triangle. Round to hundredth.



$m\angle A = \cos^{-1}\left(\frac{5}{5.7}\right)$

$m\angle A \approx 28.69°$

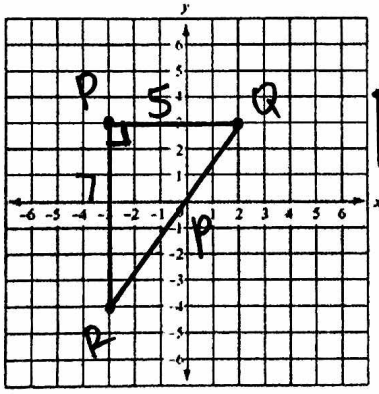
$m\angle B \approx 61.31°$ by Δ sum Thm

$\tan(28.69) = \frac{a}{5}$

$a = (5)(0.5473)$

$a \approx 2.74$

11. Solve the triangle if in ΔPQR, P(-3, 3), Q(2, 3), R(-3, -4)



$PQ = 5$

$PR = 7$

$m\angle P = 90°$

$m\angle Q = \tan^{-1}\left(\frac{7}{5}\right)$

$m\angle Q \approx 54.46°$

$m\angle R \approx 35.54°$ by Δ sum Thm

$\cos(54.46) = \frac{5}{p}$

$p = \frac{5}{0.5813}$

$p \approx 8.60$