

Name:

Date:

Period: 6

Solving Right Triangles

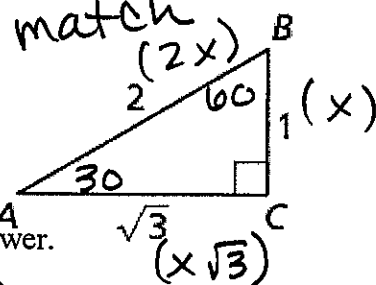
Lesson Objective: INBAT use inverse trig ratios to solve right Δ s.

Example:

1. What type of triangle is ΔABC ? How do you know? 30-60-90 b/c side relationship:
2. Determine which of the two acute angles has a cosine of 0.5.

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

$$\cos B = \frac{1}{2} \rightarrow \angle B$$

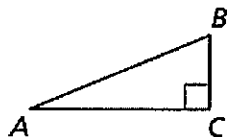


3. What must the measure of the angle from problem #1 be? Briefly explain your answer.

$m\angle B = 60^\circ$ b/c across from LL in 30-60-90 Δ ...

Inverse Trigonometric Ratios

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



Inverse Tangent	Inverse Sine	Inverse Cosine
If $\tan A = \frac{BC}{AC}$, then $m\angle A = \tan^{-1}\left(\frac{BC}{AC}\right)$	If $\sin A = \frac{BC}{AB}$, then $m\angle A = \sin^{-1}\left(\frac{BC}{AB}\right)$	If $\cos A = \frac{AC}{AB}$, then $m\angle A = \cos^{-1}\left(\frac{AC}{AB}\right)$
$\tan^{-1}\left(\frac{\text{opp}}{\text{adj}}\right) = m\angle ??$	$\sin^{-1}\left(\frac{\text{opp}}{\text{hyp}}\right) = m\angle ??$	$\cos^{-1}\left(\frac{\text{adj}}{\text{hyp}}\right) = m\angle ??$

Example:

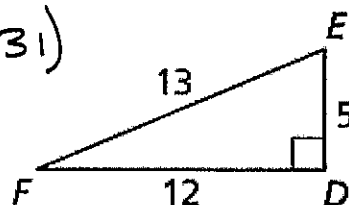
4. Determine which of the acute angles has a sine ratio of $\frac{12}{13}$. Then, approximate that angle measure to the nearest hundredth.

$$\sin E = \frac{12}{13}$$

$$m\angle E = \sin^{-1}(0.9231)$$

$$m\angle E = \sin^{-1}\left(\frac{12}{13}\right)$$

$$m\angle E \approx 67.38^\circ$$



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.

$$\tan G = 0.43$$

$$\sin H = 0.68$$

$$\cos K = 0.94$$

$$m\angle G = \tan^{-1}(0.43) \approx 23.27^\circ$$

$$m\angle H \approx 42.84^\circ$$

$$m\angle K \approx 19.95^\circ$$

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 side lengths
2. one side length + one acute $\angle$ measure

Example:

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

$$3^2 + 2^2 = c^2$$

$$c = \sqrt{13}$$

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

$$m\angle A = \tan^{-1}(1.5)$$

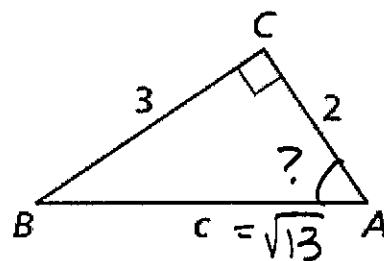
$$m\angle A \approx 56.31^\circ$$

$$\cos A = \frac{2}{\sqrt{13}}$$

$$\cos A = 0.5547$$

$$m\angle A \approx \cos^{-1}(0.5547)$$

$$m\angle A \approx 56.31^\circ$$



$$m\angle B \approx 33.69^\circ$$

Δ sum thm

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

$$\sin(65) = \frac{g}{13}$$

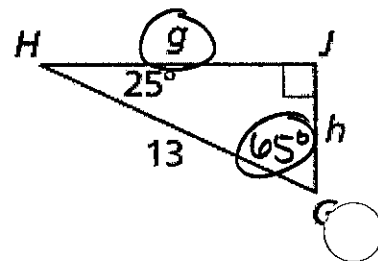
$$0.9063 = \frac{g}{13}$$

$$g \approx 11.78$$

$$\tan(65) = \frac{11.78}{h}$$

$$2.1445 = \frac{11.78}{h}$$

$$h \approx 5.49$$



8. Your school is building a raked stage (slants upward from front to back to give the audience a better view). The stage will be 30 feet long from front to back, with a total rise of 2 feet. You want the rake (in other words, the angle of elevation) to be 5° or less for safety purposes. Is the raked stage within your desired range?

Think About It... Can the sine ratio be greater than 1? Why or why not?

Think About It... Can the tangent ratio be greater than 1? Why or why not?