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Date: 2/27/18

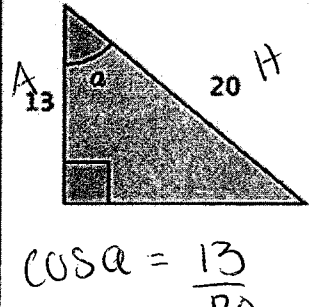
CC GEOMETRY

TROICI

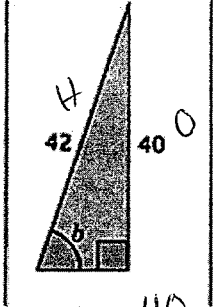
LESSON #11: TRIGONOMETRY WITH THE PYTHAGOREAN THEOREM

Do Now:

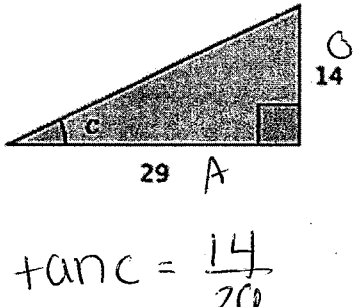
1. Find the missing angle of the following: *nearest tenth*



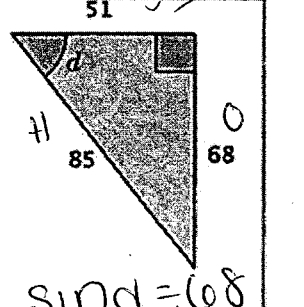
$\cos a = \frac{13}{20}$
 $a = 49.5^\circ$



$\sin b = \frac{40}{42}$
 $b = 72.2^\circ$



$\tan c = \frac{14}{29}$
 $c = 25.8^\circ$



$\sin d = \frac{68}{85}$
 $d = 53.1^\circ$

YOU PICK!

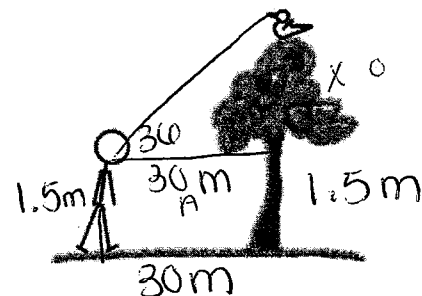
2. Scott, whose eye level is 1.5 m above the ground, stands 30 m from a tree. Scott's angle of elevation is 36 degrees. How far above the ground is the bird, to the nearest tenth?


$$\tan 36 = \frac{x}{30}$$

$$x = 30 \tan 36$$

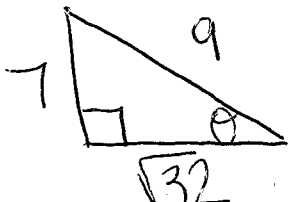
$$x = 21.7962 + 1.5$$

23.3 m



HOW TO USE THE PYTHAGOREAN THEOREM TO FIND TRIG. RATIOS	EXAMPLE
<ol style="list-style-type: none"> 1. Draw a right triangle 2. Label the sides based on the ratio given 3. Use $a^2 + b^2 = c^2$ to find the missing side 4. Use SOHCAHTOA to find desired trig ratio. 	<p>In a right triangle, with an acute angle of measure θ, $\sin \theta = \frac{1}{2}$. What is the value of $\cos \theta$?</p>  <p>SOHCAHTOA</p> $1^2 + x^2 = 2^2$ $1 + x^2 = 4$ $\sqrt{x^2} = \sqrt{3}$ $x = \sqrt{3}$

1. In a right triangle, with acute angle of measure θ , $\sin \theta = \frac{7}{9}$. What is the value of $\tan \theta$? Draw a diagram as part of your response.



$$7^2 + x^2 = 9^2$$

$$-7^2 \quad -49$$

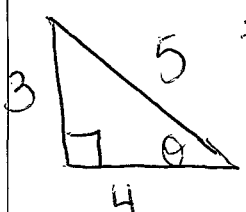
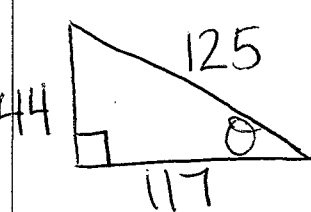
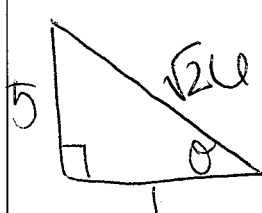
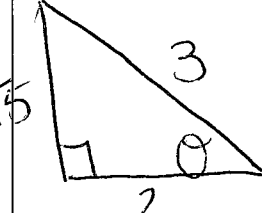
$$\sqrt{x^2} = \sqrt{32}$$

$$x = \sqrt{32}$$

SOHCAHTOA

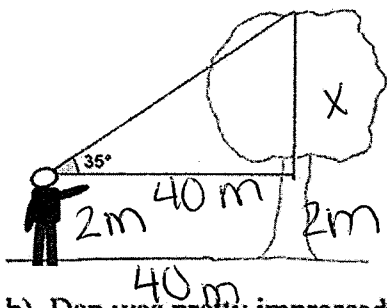
$$\cos \theta = \frac{\sqrt{32}}{9}$$

Find the missing trigonometric function below:

<p>If $\cos\theta = \frac{4}{5}$, find $\tan\theta$.</p>  <p>tripple!</p> <div style="border: 1px solid black; padding: 5px; display: inline-block;"> $\tan\theta = \frac{3}{4}$ </div>	<p>If $\sin\theta = \frac{44}{125}$, find $\cos\theta$.</p>  $44^2 + x^2 = 125^2$ $x^2 = 13689$ $x = 117$ <div style="border: 1px solid black; padding: 5px; display: inline-block;"> $\cos\theta = \frac{117}{125}$ </div>
<p>If $\tan\theta = \frac{5}{1}$, find $\sin\theta$.</p>  $5^2 + 1^2 = x^2$ $\sqrt{26} = \sqrt{x^2}$ <div style="border: 1px solid black; padding: 5px; display: inline-block;"> $\sin\theta = \frac{5}{\sqrt{26}}$ </div>	<p>If $\sin\theta = \frac{\sqrt{5}}{3}$, find $\cos\theta$.</p>  $(\sqrt{5})^2 + x^2 = 3^2$ $5 + x^2 = 9$ $\sqrt{x^2} = \sqrt{4}$ $x = 2$ <div style="border: 1px solid black; padding: 5px; display: inline-block;"> $\cos\theta = \frac{2}{3}$ </div>

ANGLE OF ELEVATION PRACTICE:

1. a) Dan was walking through a forest when he came upon a sizable tree. Dan estimated he was about 40 meters away from a tree when he measured the angle of elevation between the horizontal and the top of the tree to be 35 degrees. If Dan is about 2 meters tall, about how tall is the tree? Round to the nearest meter.



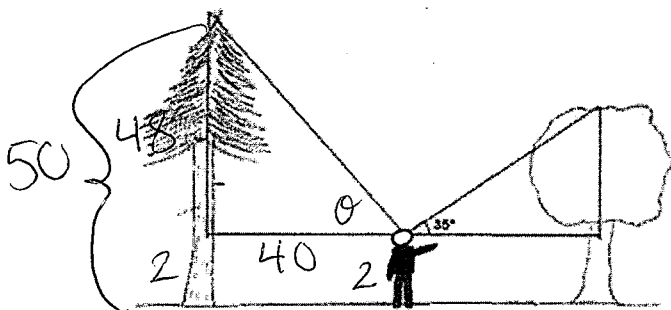
$$\tan 35 = \frac{x}{40}$$

$$x = 40 \tan 35$$

$$x \approx 28$$

$$+ 2 = \boxed{30 \text{ m tall}}$$

- b) Dan was pretty impressed with this tree ... until he turned around and saw a bigger one, also 40 meters away but in the other direction. "Wow," he said. "I bet that tree is at least 50 meters tall!" Then he thought a moment. "Hmm ... if it is 50 meters tall, I wonder what angle of elevation I would measure from my eye level to the top of the tree?" What angle will Dan find if the tree is 50 meters tall? Explain your reasoning. Round to the nearest degree.

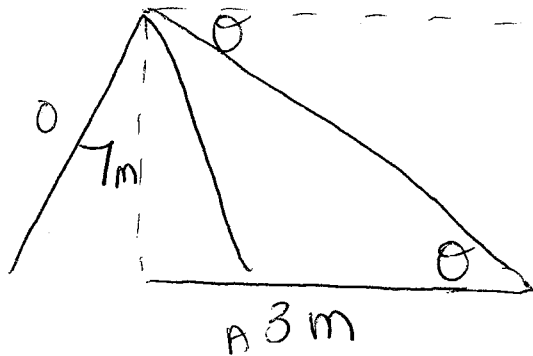


$$\tan \theta = \frac{48}{40}$$

$\theta = 50^\circ$

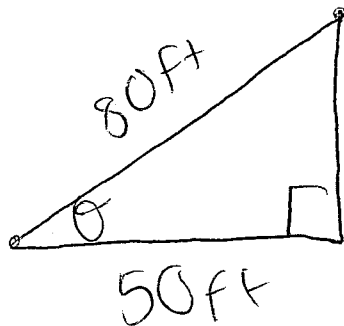
height of mountain = 7 miles

2. A group of friends have hiked to the top of the Mile High Mountain. When they look down, they can see their campsite, which they know is approximately 3 miles from the base of the mountain.
- Sketch a drawing of the situation.
 - What is the angle of depression, to the nearest degree?



$$\tan \theta = \left(\frac{7}{3}\right)^{-1}$$
$$\theta = 67^\circ$$

3. A roller coaster travels 80 ft of track from the loading zone before reaching its peak. The horizontal distance between the loading zone and the base of the peak is 50 ft.
- Model the situation using a right triangle.
 - At what angle is the roller coaster rising according to the model, to the nearest degree?



$$\cos \theta = \frac{50}{80}$$
$$\theta = 51.3^\circ$$
$$\theta = 51^\circ$$

