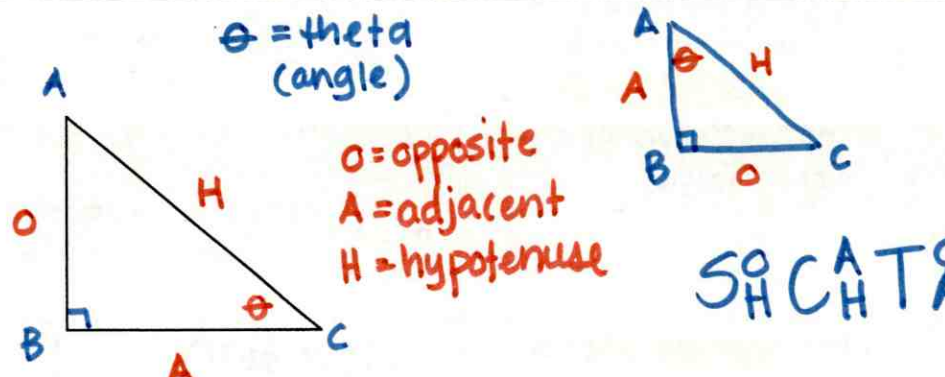
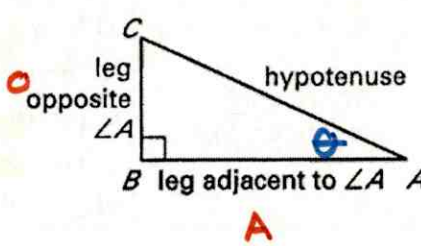
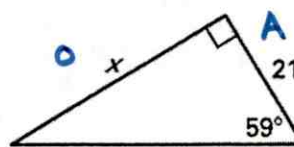
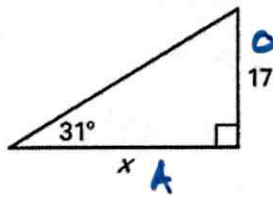


7.5

Apply Tangent, Sine and Cosine Ratios

Vocabulary	Definition	Example
<p>TRIGONOMETRIC RATIO</p>	<p>A <i>trigonometric ratio</i> is a ratio of the lengths of two sides in a right triangle.</p> <p>You will use a trigonometric ratio to find a side or an acute angle in a right triangle.</p>	<p>$\theta = \text{theta (angle)}$</p>  <p>O = opposite A = adjacent H = hypotenuse</p> <p>SOH CAHTOA</p>
<p>TANGENT</p>	<p>The ratio of the lengths of the legs in a right triangle is called the <i>tangent</i> of the angle.</p>	<p>TANGENT RATIO</p> <p>Let $\triangle ABC$ be a right triangle with acute $\angle A$. The tangent of $\angle A$ (written as $\tan A$) is defined as follows:</p> $\tan A = \frac{\text{length of leg opposite } \angle A}{\text{length of leg adjacent to } \angle A} = \frac{BC}{AB}$ 
<p>Examples</p>	<p>Find the value of x.</p>	<p>$\tan(59) = \frac{x}{21}$</p> <p>$x = 21(\tan(59))$</p> <p>$x = 34.9$</p> 
<p>$\tan(\theta) = \frac{O}{A}$</p>		<p>$\tan(31) = \frac{17}{x}$</p> <p>$x(\tan(31)) = 17$</p> <p>$x = \frac{17}{\tan(31)}$</p> <p>$x = 28.3$</p>

SIN C H T A

SINE and COSINE

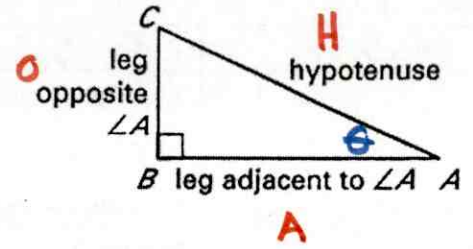
Sine and cosine are trigonometric ratios for acute angles that involve the lengths of a leg and the hypotenuse of a right triangle.

SINE and COSINE RATIO

Let $\triangle ABC$ be a right triangle with acute $\angle A$. The sine of $\angle A$ and the cosine of $\angle A$ (written as $\sin A$ and $\cos A$) are defined as follows:

$$\sin A = \frac{\text{length of leg opposite } \angle A}{\text{length of hypotenuse}} = \frac{BC}{AC}$$

$$\cos A = \frac{\text{length of leg adjacent to } \angle A}{\text{length of hypotenuse}} = \frac{AB}{AC}$$



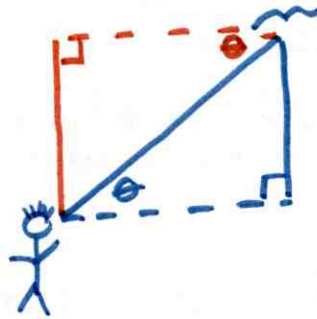
ANGLE of ELEVATION

When looking UP at an object, the angle that your line of sight makes with a horizontal line is the angle of elevation.

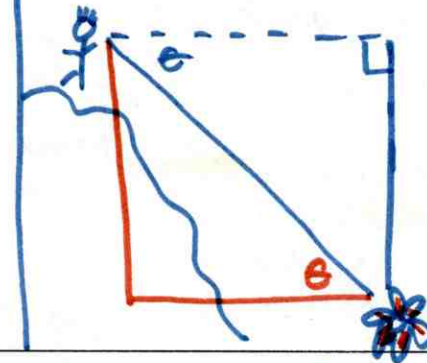
ANGLE of DEPRESSION

When looking DOWN at an object, the angle that your line of sight makes with a horizontal line is the angle of depression.

Elevation



Depression



angle of elevation and depression are \cong by A1

Examples

$$\sin(\theta) = \frac{O}{H}$$

$$\cos(\theta) = \frac{A}{H}$$

$$\sin(28) = \frac{x}{15}$$

$$x = 15(\sin(28))$$

$$\boxed{x = 7}$$

$$\sin(32) = \frac{21}{x}$$

$$x = \frac{21}{\sin(32)}$$

$$\boxed{x = 39.6}$$

$$\cos(10) = \frac{x}{12}$$

$$x = 12(\cos(10))$$

$$\boxed{x = 11.8}$$

$$\cos(21) = \frac{15}{x}$$

$$x = \frac{15}{\cos(21)}$$

$$\boxed{x = 16.1}$$

$$\tan(22) = \frac{x}{18}$$

$$x = 18(\tan(22))$$

$$\boxed{x = 7.3}$$

$$\cos(22) = \frac{18}{y}$$

$$y = \frac{18}{\cos(22)}$$

$$\boxed{y = 19.4}$$