

Geometry

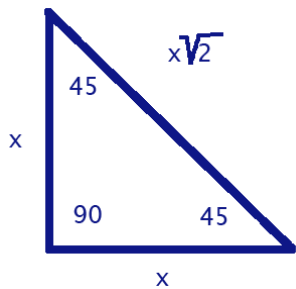
Unit 3: Right Triangle Trigonometry

Dear Parents,

Below is information regarding Unit 3, Right Triangle Trigonometry.

In this unit students will:

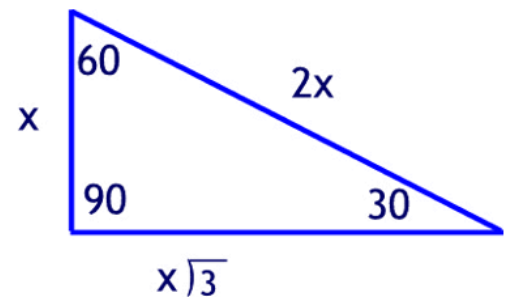
- explore the relationships that exist between sides and angles of right triangles
- build upon their previous knowledge of similar triangles and of the Pythagorean Theorem to determine the side length ratios in special right triangles
- understand the conceptual basis for the functional ratios sine and cosine
- explore how the values of these trigonometric functions relate in complementary angles
- to use trigonometric ratios to solve problems
- develop the skills and understanding needed for the study of many technical areas
- build a strong foundation for future study of trigonometric functions of real numbers



Textbook Connections

Holt McDougal Textbook:
Analytic Geometry, Unit 2, Modules 9-10

Online Access:
<http://my.hrw.com/>



Right Triangle Trigonometry Vocabulary Terms/Properties

Complementary Angles: two angles whose sum is 90°

$$\underline{\text{sine of } \theta} = \sin(\theta) = \frac{\text{length of opposite side}}{\text{length of the hypotenuse}}$$

$$\underline{\text{cosine of } \theta} = \cos(\theta) = \frac{\text{length of adjacent side}}{\text{length of the hypotenuse}}$$

$$\underline{\text{tangent of } \theta} = \tan(\theta) = \frac{\text{length of opposite side}}{\text{length of adjacent side}}$$

Properties, theorems & corollaries:

- 1) 30° - 60° - 90° triangles pattern: hypotenuse, shorter leg, longer leg = $2a$, a , $a\sqrt{3}$
- 2) 45° - 45° - 90° triangles pattern: leg lengths equal & hypotenuse is $\sqrt{2}$ times the length of a leg
- 3) Pair of complementary angles in a rt. triangle, the sine of one angle is the cosine of its complement.
- 4) Pair of complementary angles in a rt. triangle, the tangent of one angle is the reciprocal of the tangent of its complement.

For examples & help with vocabulary, visit:

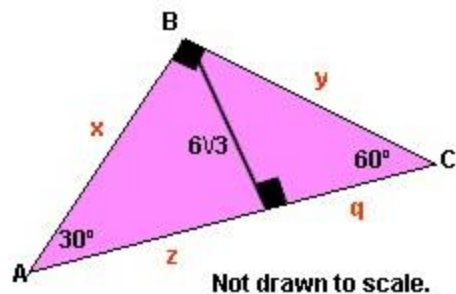
<http://intermath.coe.uga.edu/>

Web Resources

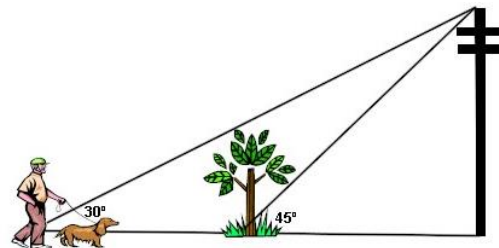
- <https://mathbitsnotebook.com/Geometry/RightTriangles/RT306090.html> - special right triangles
- <https://www.cliffsnotes.com/study-guides/geometry/right-triangles/special-right-triangles> - special right triangles
- http://www.beaconlearningcenter.com/documents/1688_01.pdf -special right triangles
- <http://www.purplemath.com/modules/basirati.htm> -trigonometry ratios
- <http://www.themathlab.com/toolbox/geometry%20stuff/trigratios.htm> -trig. table
- http://hotmath.com/hotmath_help/topics/trigonometric-ratios.html -trig ratio short notes

Practice

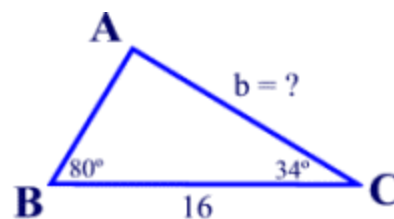
1. What are the measurements of x , y , q and z ?



2. A man is walking his dog on level ground in a straight line with the dog's favorite tree. The angle of elevation from the man's present position to the top of a nearby telephone pole is 30° . The angle of elevation from the tree to the top of the telephone pole is 45° . If the telephone pole is 40 feet tall, how far is the man with the dog from the tree? Express answer to the nearest tenth of a foot.



3. Find the **exact** value of: $\cos 60^\circ + \sin 30^\circ - \tan 45^\circ$.
4. Find to the *nearest degree*, the measure of an acute angle formed by the x -axis and the line containing the points $(4,3)$ and $(8,9)$.
5. In $\triangle ABC$, $m\angle B = 80^\circ$, $m\angle C = 34^\circ$ and $a = 16$. Find the length of b to the *nearest tenth*



Answers:

1. $x = 12\sqrt{3}$; $y = 12$; $q = 6$; $z = 18$
2. 29.3 ft
3. 0
4. 56°
5. ≈ 17.2