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°

\[
\begin{align*}
\text{sine of } \theta &= \sin(\theta) = \frac{\text{length of opposite side}}{\text{length of the hypotenuse}} \\
\text{cosine of } \theta &= \cos(\theta) = \frac{\text{length of adjacent side}}{\text{length of the hypotenuse}} \\
\text{tangent of } \theta &= \tan(\theta) = \frac{\text{length of opposite side}}{\text{length of adjacent side}}
\end{align*}
\]

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](https://mathbitsnotebook.com/Geometry/RightTriangles/RT306090.html) - special right triangles
- [https://www.cliffsnotes.com/study-guides/geometry/right-triangles/special-right-triangles](https://www.cliffsnotes.com/study-guides/geometry/right-triangles/special-right-triangles) - special right triangles
- [http://www.purplemath.com/modules/basirati.htm](http://www.purplemath.com/modules/basirati.htm) - trigonometry ratios
- [http://www.themathlab.com/toolbox/geometry%20stuff/trigratios.htm](http://www.themathlab.com/toolbox/geometry%20stuff/trigratios.htm) - trig table

### Practice

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

![Diagram](image)

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.

![Diagram](image)

3. Find the exact value of: \( \cos 60° + \sin 30° - \tan 45° \).

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 \( \triangle ABC \), \( m \angle B = 80° \), \( m \angle C = 34° \) and \( a = 16 \). Find the length of \( b \) to the nearest tenth.

![Diagram](image)

### Answers:

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