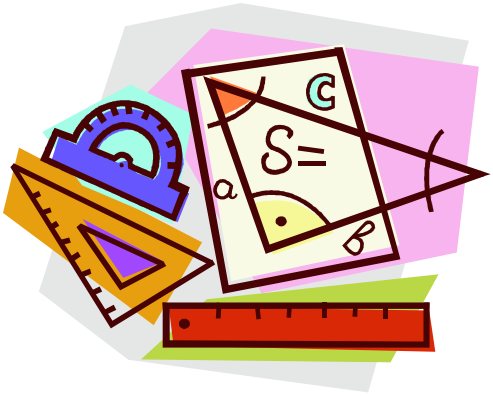
Algebra/Geometry Institute Summer 2005

Lesson Plan #2- Pythagorean Theorem



Faculty Name: Derandel Allen
School: Leland School Park
Leland, MS
Grade Level: 8th Grade/Pre-Algebra,

1 Teaching objective(s)

3d – Solve Pythagorean Theorem problems using formulas

2 Instructional Activities

- Introduce the lesson by drawing a right triangle on the board (or chart paper).
- Ask the students to discuss all of the characteristics of the triangle.
- Listen for key terms like hypotenuse, adjacent angles, and legs.
- If they don't come up with the terms on their own, ask those specific questions about the legs and the hypotenuse of the right triangle.
- Make sure the discussion leads to the idea of Pythagorean triples.
    - The formula for Pythagorean Theorem is $a^2 + b^2 = c^2$, were ***a*** and ***b*** both represent the legs of the triangle and ***c*** represents the hypotenuse.
    - True right triangles form what is known as Pythagorean triples
        - The square of the hypotenuse is equal to the sum of the squares of the two legs.
    - Provide examples of the Pythagorean triples
    - We can find Pythagorean triples by using the following formula:

For any two integers, u and v, the integers a, b, and c will be Pythagorean triples if:

$a = u^2 - v^2$
$b = 2uv$
$c = u^2 + u^2$

For example, let u = 2 and v = 1, then

$a = u^2 - v^2 = 2^2 - 1^2 = 4 - 1 = 3$
$b = 2uv = 2(2)(1) = 4$
$c = u^2 + v^2 = 2^2 + 1^2 = 4 + 1 = 5$

Therefore, 3, 4, 5 is a Pythagorean triple

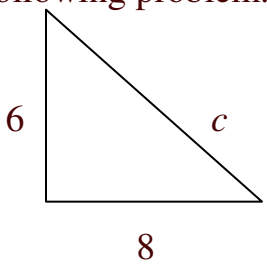
- Provide practice; find the set of Pythagorean triples. Let $u = 3$, and $v = 1$.

Using the formula, find *a* first,
$a = u^2 - v^2 = 3^2 - 1^2 = 9 - 1 = 8$, then find *b,*
$b = 2uv = 2(3)(1) = 6$, an now find *c*
$c = u^2 + v^2 = 3^2 + 1^2 = 9 + 1 = 10$, therefore,
the Pythagorean triples is 6, 8, 10

- Complete practice problems, (See Attachment #1)

- Provide guided practice of finding the missing side of a right triangle.

Consider the following problem.



If the hypotenuse is missing, use the following formula:
$a^2 + b^2 = c^2$

Use the following formula

$a^2 + b^2 = c^2$
$8^2 + 6^2 = c^2$
$64 + 36 = c^2$
$100 = c^2$
$\sqrt{100} = \sqrt{c^2}$
$10 = c$

- Complete quiz using the Pythagorean theorem

3 Materials and Resources

- Glencoe Pre-Algebra, An Integrated Transition to Algebra & Geometry, lesson 13-4, page 676-681, 2001.
- Glencoe, McGraw Hill, Pre- Algebra, Geometry, activity masters. Page 47, 2001.
- Glencoe, McGraw Hill, Pre- Algebra, Geometry, math lab & modeling math masters. Page 47
- Chalkboard
- Chalk
- Overhead Projector
- Screen
- Teacher made activity sheets

4 Assessment

- Monitor students as they complete practice and individual activity
- Question and answer period during discussion
- Monitor boardwork
- Administer quiz (10 Questions), grade and give immediate feedback. (see Attachment #2)

Name _____ Date _____

Attachment #1

Pythagorean Triples
Practice Worksheet

Using the following formulas:

a = $u^2 - v^2$

b = $2uv$

c = $u^2 + u^2$

Form sets of Pythagorean triples using the following values of u and v.

1. $u = 3, v = 1$
2. $u = 3, v = 2$
3. $u = 4, v = 1$
4. $u = 6, v = 1$
5. $u = 6, v = 5$
6. $u = 5, v = 2$
7. See how many more sets of Pythagorean Triples you can form.

Attachment #2

Name _____ Date _____

Pythagorean Theorem
Quiz

If *a* and *b* are the sides of a triangle and *c* is the hypotenuse, find the missing side of each of the right triangles, Round the decimals answers to the nearest tenth.

1. a = 12, b = 16

2. b = 21, c = 29

3. b = 16, c = 20

4. a = 2, b = 5

5. a = 5, c = 10

6. a = 7, b = 9

7. b = 3, c = 7

8. a = 7, b = 7

9. b = 36, c = 85

10. a = 14, b = 15