4-5 The Converse of the Pythagorean Theorem

Objective: Use the Converse of the Pythagorean Theorem to classify triangles

The Converse of the Pythag. Th. – If $c^2 = a^2 + b^2$ then the triangle is a right triangle

$c^2 = a^2 + b^2$ then the trianlge is **right**

c is always the biggest side

$c^2 > a^2 + b^2$ then the triangle is **obtuse**

↖ is big, c^2 is bigger

$c^2 < a^2 + b^2$ then the triangle is **acute**

↖ is small, c^2 is smaller

Examples:

Classify the triangle by angles and sides with sides:

1. 9, 12, 12
   a b c

$12^2 \mid 9^2 + 12^2$

$144 \mid 81 + 144$

$144 < 225$

acute

2. 5, 12, 13
   a b c

c^2	$a^2 + b^2$
right triangle 13^2	$5^2 + 12^2$
169	$25 + 144$ ✓
$169 = 169$	

3. 8, 9, 10
   a b c

c^2	$a^2 + b^2$
10^2	$8^2 + 9^2$
100	$64 + 81$ ✓
$100 < 145$	

acute triangle

4. 3, 16, 18
   a b c

$c^2 \mid a^2 + b^2$

$18^2 \mid 3^2 + 16^2$

$324 \mid 9 + 256$

$324 > 265$

obtuse

5. 5, 5, 5

$5^2 \mid 5^2 + 5^2$

$25 \mid 25 + 25$

$25 \mid 50$

acute

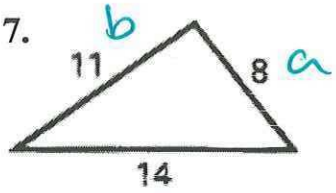
6. 3, 4, 5
   a b c

$5^2 \mid 3^2 + 4^2$

$25 \mid 9 + 16$

$25 = 25$

right

7. 

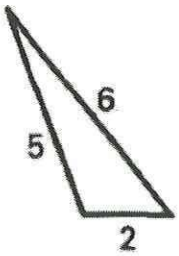
$c^2 \mid a^2+b^2$

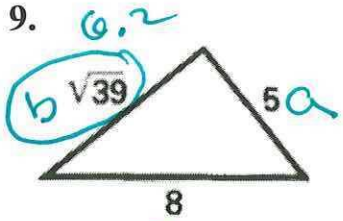
$14^2 \mid 8^2+11^2$

$196 \mid 64+121$

$196 > 185$

obtuse

8. 

9. 

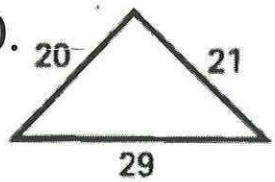
$c^2 \mid a^2+b^2$

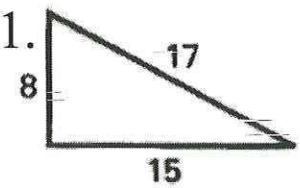
$8^2 \mid 5^2+(\sqrt{39})^2$

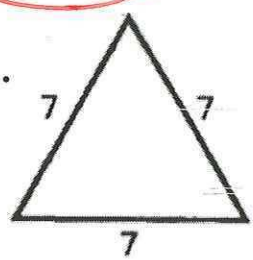
$64 \mid 25+39$

$64 = 64$

right

10. 

11. 

12. 

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#9-29 odd