Name: KEY Hour: _____ Date: _____

NOTES: Section 12.6 – The Pythagorean Theorem & its Converse

Goals: #1 - I can use the Pythagorean Theorem

Homework: Section 12.6 Worksheet

Warm Up:

1. Solve the equation. Check for extraneous solutions.

a. $\sqrt{2x-6}-5=5$

$\sqrt{2x-6}=10$

$(\sqrt{2x-6})^2=(10)^2$

$2x-6=100$

$2x=106$

$\boxed{x=53}$

Check:

$\sqrt{2(53)-6}-5=5$

$\sqrt{100}-5=5$

$10-5=5$ ✓

b. $x=\sqrt{15x-14}$

$(x)^2=(\sqrt{15x-14})^2$

$x^2=15x-14$

$x^2-15x+14=0$

$(x-14)(x-1)=0$

Check: $\boxed{x=14}$ $\boxed{x=1}$

$14=\sqrt{15(14)-14}$ $1=\sqrt{15(1)-14}$

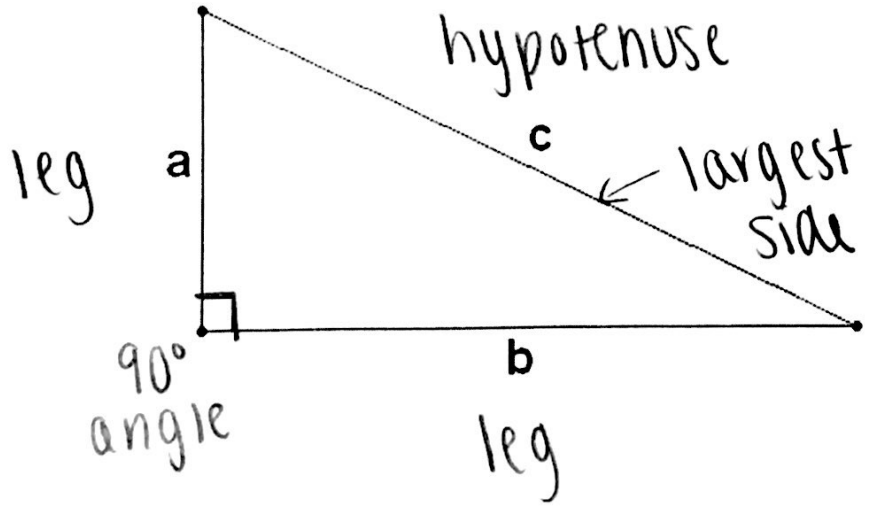
$14=\sqrt{196}$ $1=\sqrt{1}$

$14=14$ ✓ $1=1$ ✓

Notes:

If a triangle is a right triangle (has a 90° angle), then we can use the Pythagorean Theorem to find any side of the triangle.

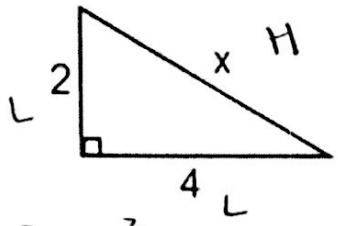
- Pythagorean theorem: $a^2+b^2=c^2$



Name:_____ Hour: _____ Date: _____

Example #1: Find the unknown lengths of the right triangle.

1.



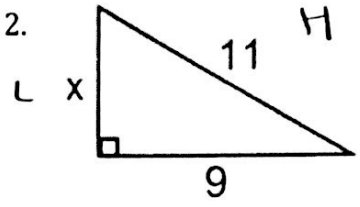
$2^2 + 4^2 = x^2$

$4 + 16 = x^2$

$20 = x^2$

$x = \sqrt{20}$

2.



$x^2 + 9^2 = 11^2$

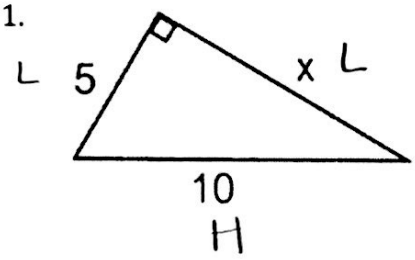
$x^2 + 81 = 121$

$x^2 = 40$

$x = \sqrt{40}$

You practice: Find the unknown lengths of the right triangle.

1.



$x^2 + 5^2 = 10^2$

$x^2 + 25 = 100$

$x^2 = 75$

$x = \sqrt{75}$

Example #2: Let a and b represent the lengths of the legs of a right triangle and let c represent the length of the hypotenuse. Find the unkown length.

1. $a = 5, b = 6$ (L, L)

$a^2 + b^2 = c^2$

$5^2 + 6^2 = c^2$

$25 + 36 = c^2$

$61 = c^2$

$c = \sqrt{61}$

2. $b = 8, c = 10$ (L, H)

$a^2 + 8^2 = 10^2$

$a^2 + 64 = 100$

$a^2 = 36$

$a = 6$

Name:_____ Hour: _____ Date: _____

Example #3: Determine whether the given lengths are sides of a right triangle.

1. $15, 20, 25$ (a, b, c) $\quad a^2+b^2=c^2$

$15^2+20^2=25^2$

$225+400=625$

$625=625$ ✓

Yes

2. $5, 11, 12$ (a, b, c)

$5^2+11^2=12^2$

$25+121=144$

$146 \neq 144$

No

You practice: Determine whether the given lengths are sides of a right triangle.

1. $7, 24, 26$ (a, b, c)

$7^2+24^2=26^2$

$49+576=676$

$625 \neq 676$

No

2. $5, 12, 13$ (a, b, c)

$5^2+12^2=13^2$

$25+144=169$

$169=169$ ✓

Yes