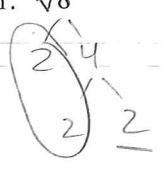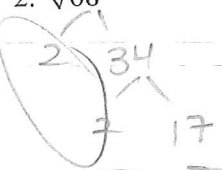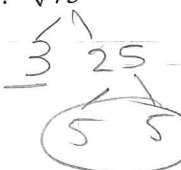10.1 Pythagorean Theorem HW – Day 1
Geometry 3313
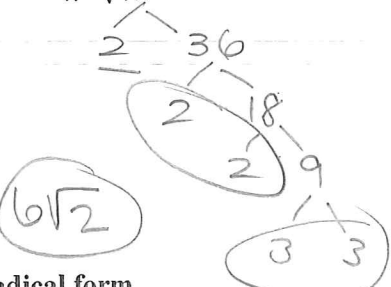
Name **Key**
Date _____ Period _____

Write each of the square roots below in simplest radical form.
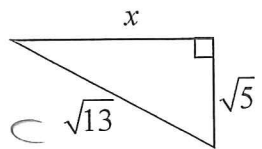
1. $\sqrt{8}$

2 4
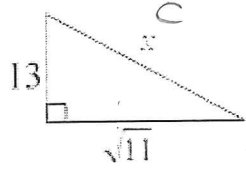2 2

$\boxed{2\sqrt{2}}$

2. $\sqrt{68}$

2 34
2 17

$\boxed{2\sqrt{17}}$

3. $\sqrt{75}$

3 25
5 5

$\boxed{5\sqrt{3}}$

4. $\sqrt{72}$

2 36
2 18
2 9
3 3
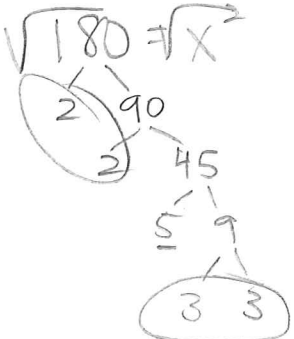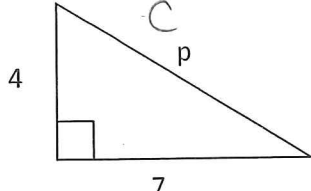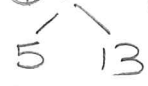
$\boxed{6\sqrt{2}}$
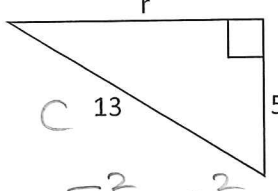
Find the missing side of each right triangle below. Be sure to put your answers in **simplest radical form**.

5.

x, $\sqrt{5}$, c $\sqrt{13}$

$x^2 + (\sqrt{5})^2 = (\sqrt{13})^2$

$x^2 + 5 = 13$

$\sqrt{x^2} = \sqrt{8} \leftarrow$ See #1 above

$x = \underline{2\sqrt{2}}$

6.

13, C, x, $\sqrt{11}$

$13^2 + (\sqrt{11})^2 = x^2$

$169 + 11 = x^2$

$\sqrt{180} = \sqrt{x^2}$

2 90
2 45
5 9
3 3

$x = \underline{6\sqrt{5}}$

7.

C, p, 4, 7

$4^2 + 7^2 = p^2$

$16 + 49 = p^2$

$\sqrt{65} = \sqrt{p^2}$

5 13

$p = \underline{\sqrt{65}}$

8.

r, C 13, 5

$5^2 + r^2 = 13^2$

$25 + r^2 = 169$

$\sqrt{r^2} = \sqrt{144}$

$r = \underline{12}$

9. Jeff throws a pass from point A to a receiver at point B. How long was the pass (round to the nearest tenth)?

$$14^2 + 25^2 = c^2$$
$$196 + 625 = c^2$$
$$\sqrt{821} = \sqrt{c^2}$$
$$\approx 28.7 \text{ yd}$$

10. The perimeter of a square is 32. Find the length of the diagonals. Draw a picture to help you solve.

$$8^2 + 8^2 = c^2$$
$$64 + 64 = c^2$$
$$\sqrt{128} = \sqrt{c^2} \qquad c = 8\sqrt{2}$$

```
    2   64
       /  \
      8    8
```

11. Danny starts out riding his bikes 10 miles due West and then finishes his ride by turning and heading 5 miles due North. About how many miles is Danny from his starting point (to the nearest tenth)?

$$5^2 + 10^2 = c^2$$
$$25 + 100 = c^2 \qquad c = 11.2 \text{ mi}$$
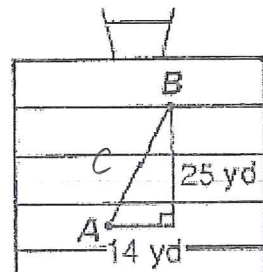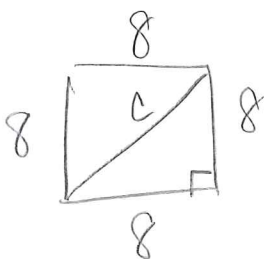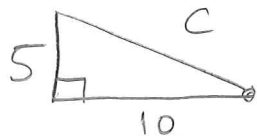$$\sqrt{125} = \sqrt{c^2}$$

12. Find the value of x in the triangle below. Keep your answer in simplest radical form.

$$(\sqrt{5})^2 + y^2 = (\sqrt{21})^2 \qquad (\sqrt{5})^2 + 7^2 = x^2$$
$$5 + y^2 = 21 \qquad\qquad 5 + 49 = x^2$$
$$y^2 = \sqrt{16} \qquad\qquad \sqrt{54} = \sqrt{x^2}$$
$$y = 4$$

```
   2   27
      /  \
     3    9
         / \
        3   3
```

$$x = \underline{3\sqrt{6}}$$

Name __Key__

Date _____ Period _____

Do the given side lengths form a right triangle? Explain why or why not.

a. 3, 5, 4

$$3^2 + 4^2 \overset{?}{=} 5^2$$
$$9 + 16 \overset{?}{=} 25$$
$$25 = 25$$
(YES)

b. 35, 21, 28

$$21^2 + 28^2 \overset{?}{=} 35^2$$
$$441 + 784 \overset{?}{=} 1225$$
$$1225 = 1225$$
(YES)

c. 45, 60, 80

$$45^2 + 60^2 \overset{?}{=} 80^2$$
$$2025 + 3600 \overset{?}{=} 6400$$
$$5625 \neq 6400$$
(No)

d. 15, 39, 36

$$15^2 + 36^2 \overset{?}{=} 39^2$$
$$225 + 1296 \overset{?}{=} 1521$$
$$1521 = 1521$$
(YES)

2. Classify the triangle as acute, obtuse, or right based on the side lengths.

a. 4, 5, 7

$$4^2 + 5^2 \overset{?}{=} 7^2$$
$$16 + 25 \overset{?}{=} 49$$
$$41 < 49$$
(OBTUSE)

b. 3, 10, 8

$$3^2 + 8^2 \overset{?}{=} 10^2$$
$$9 + 64 \overset{?}{=} 100$$
$$73 < 100$$
(OBTUSE)

c. 17, 15, 8

$$8^2 + 15^2 \overset{?}{=} 17^2$$
$$64 + 225 \overset{?}{=} 289$$
$$289 = 289$$
(Right)

d. 10, 9, 12

$$9^2 + 10^2 \overset{?}{=} 12^2$$
$$81 + 100 \overset{?}{=} 144$$
$$181 > 144$$
(acute)

3. On #1a, you found out that the lengths 3-4-5 make a right triangle. Lengths that make right triangles are known as **Pythagorean Triples**. Some other common Pythagorean Triples are 5-12-13, 7-24-25, and 9-40-41. Do the following multiples of Pythagorean triples also make right triangles?

a. 6, 8, 10 (multiple of 3-4-5)

$$6^2 + 8^2 = 10^2$$
$$36 + 64 = 100$$
$$100 = 100$$
YES

b. 10, 24, 26 (multiple of 5-12-13)

$$10^2 + 24^2 = 26^2$$
$$100 + 576 = 676$$
$$676 = 676$$
YES

c. 28, 96, 100 (multiple of 7-24-25)

$$28^2 + 96^2 = 100^2$$
$$784 + 9216 = 10,000$$
$$10000 = 10000$$
YES

d. 45, 200, 205 (multiple of 9-40-41)

$$45^2 + 200^2 = 205^2$$
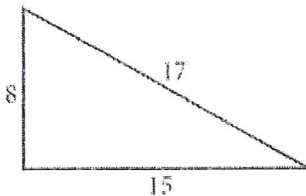$$2025 + 40000 = 42025$$
$$42025 = 42025$$
YES

4. What conclusion can you draw about multiples of Pythagorean triples?

They all form Right Triangles

5. Classify each triangle as either acute, obtuse, or right. Circle the correct classification.
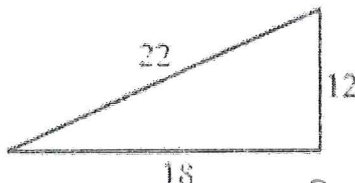
a.

17, 8, 15

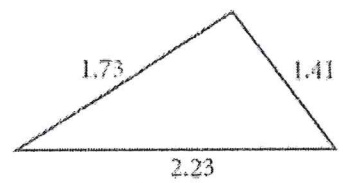$$8^2 + 15^2 = 17^2$$
$$64 + 225 = 289$$
$$289 = 289$$

b.

22, 12, 18

$$18^2 + 12^2 = 22^2$$
$$324 + 144 = 484$$
$$468 < 484$$

c.

1.73, 1.41, 2.23

$$1.73^2 + 1.41^2 = 2.23^2$$
$$2.9929 + 1.9881 = 4.9729$$
$$4.981 > 4.9729$$

a. Acute   Obtuse   (Right)

b. Acute   (Obtuse)   Right

c. (Acute)   Obtuse   Right