Special Right Triangles

<u>Directions:</u> With your group, you will be completing the three tasks.
The **first two tasks** refer to the set of **triangles in the box below. .**

Task #1

In the box **BELOW** there are 9 different triangles that are missing angles or sides. Use Pythagorean theorem and what you know about the angles of a triangle to **find the missing sides and angles.**
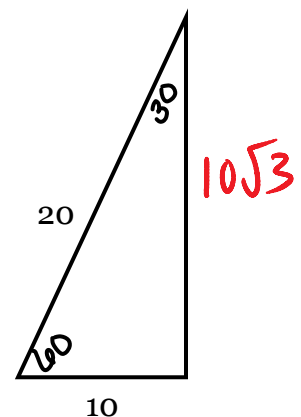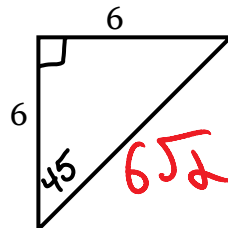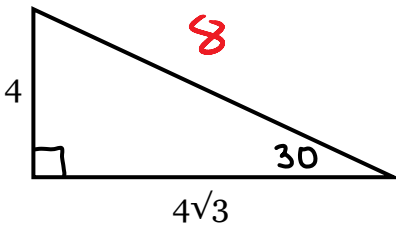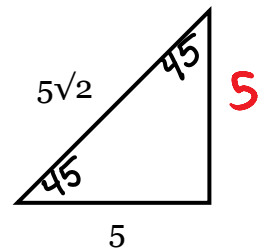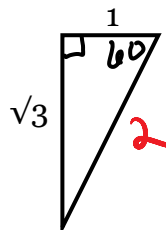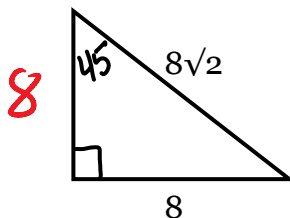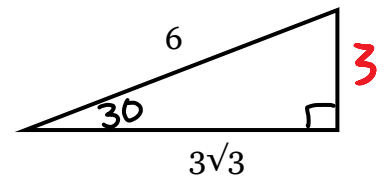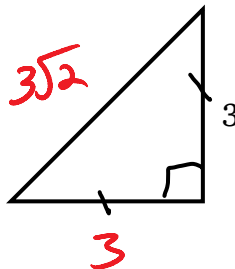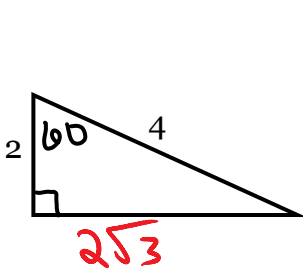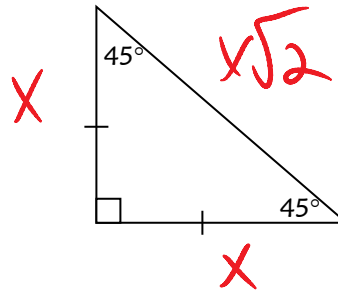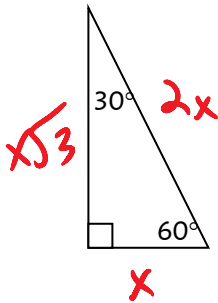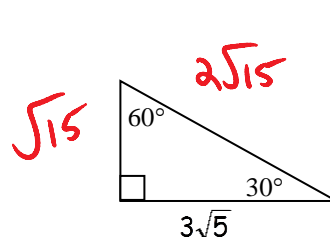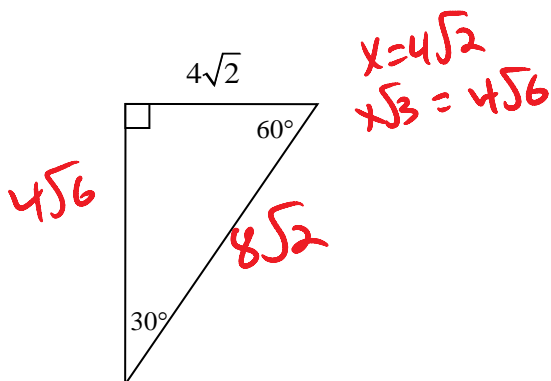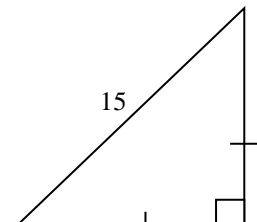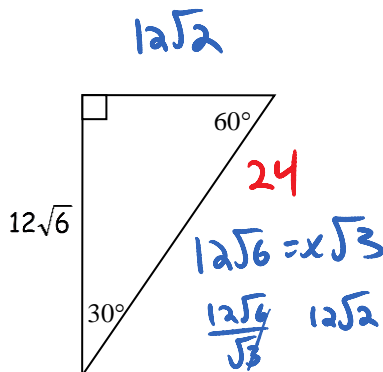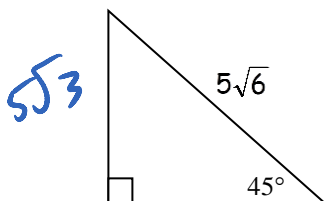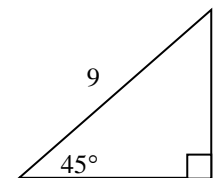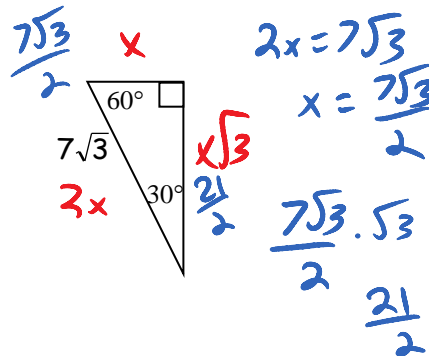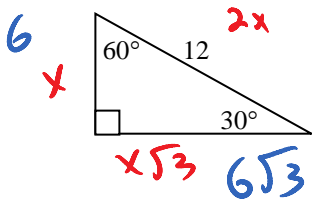
9.7 Special Right

Task #2

Now that we have discovered the relationships lets label the ratios of the sides of these special right triangles!

Task #3- PRACTICE!

In each of the following triangles, find the lengths of the two remaining sides.

6 x $2x$ $60°$ 12 $30°$ $x\sqrt{3}$ $6\sqrt{3}$

$\frac{7\sqrt{3}}{2}$ x $2x = 7\sqrt{3}$ $60°$ $7\sqrt{3}$ $x\sqrt{3}$ $30°$ $\frac{21}{2}$ $2x$

$x = \frac{7\sqrt{3}}{2}$

$\frac{7\sqrt{3} \cdot \sqrt{3}}{2}$

$\frac{21}{2}$

9 $45°$

$9 = x\sqrt{2}$

$\frac{9}{\sqrt{2}} = x$

$\frac{9}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$ $x = \frac{9\sqrt{2}}{2}$

$5\sqrt{3}$ $5\sqrt{6}$ $45°$

$5\sqrt{6} = x\sqrt{2}$

$\frac{5\sqrt{6}}{\sqrt{2}}$ $5\sqrt{3}$

$12\sqrt{2}$ $60°$ 24 $12\sqrt{6}$ $12\sqrt{6} = x\sqrt{3}$ $30°$ $\frac{12\sqrt{6}}{\sqrt{3}}$ $12\sqrt{2}$

15

$x\sqrt{2} = 15$

$\frac{15}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$

$\frac{15\sqrt{2}}{2}$

$4\sqrt{2}$ $60°$ $x = 4\sqrt{2}$ $x\sqrt{3} = 4\sqrt{6}$ $4\sqrt{6}$ $8\sqrt{2}$ $30°$

$\sqrt{15}$ $2\sqrt{15}$ $60°$ $30°$ $3\sqrt{5}$

$x\sqrt{3} = 3\sqrt{5}$
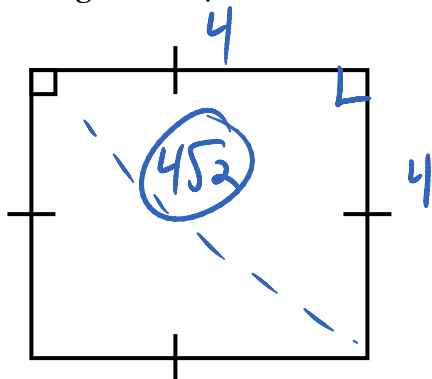
$\frac{3\sqrt{5}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$
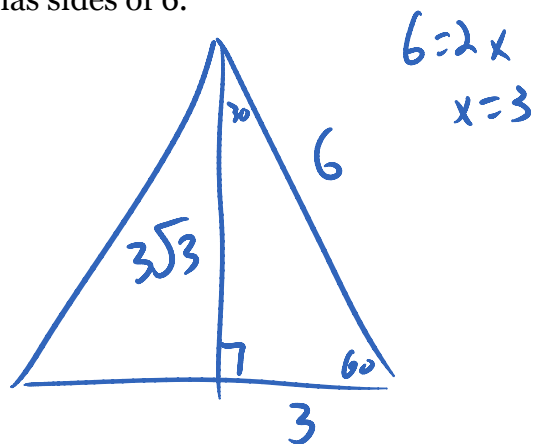
$\frac{3\sqrt{15}}{3}$ $\sqrt{15} = x$

Find the length of the diagonal of the square if the side lengths are 4.

4

$4\sqrt{2}$
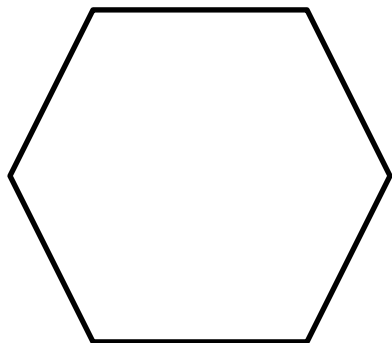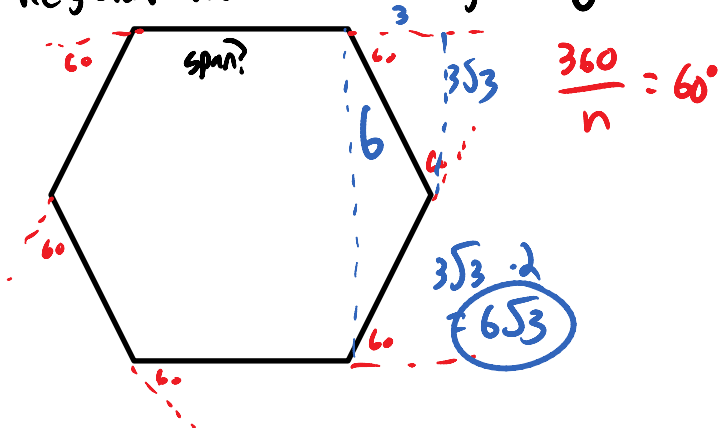
4

Find the height of an equilateral triangle that has sides of 6.

$6 = 2x$
$x = 3$

30

6

$3\sqrt{3}$

7

60

3

Special Right Triangles and span

Regular hex side length 6

span?

3

$3\sqrt{3}$

6

60

60

60

60

$\dfrac{360}{n} = 60°$

$3\sqrt{3} \cdot 2$

$6\sqrt{3}$

Reg hex length 8

45

$\dfrac{360}{n} = 45°$

8

45

$\dfrac{8}{\sqrt{2}}$ $\dfrac{8\sqrt{2}}{2}$ $4\sqrt{2}$

8

8

$4\sqrt{2} + 8 + 4\sqrt{2}$

$= 8 + 8\sqrt{2}$