# Algebra 2 Special Triangles Name:

**Special Triangles (Right Triangles)**

$30°-60°-90°$ Triangle

$$30°$$

$$60°$$

$$2x$$

$$x$$

$$x\sqrt{3}$$

 The hypotenuse is twice as long as the shorter leg

 The longer leg is $\sqrt{3}$ times as long as the shorter leg

 (The longer leg is the side opposite the $60°$ angle)

$$30°$$

$$60°$$

$$6\sqrt{3}$$

Examples:

$$30°$$

$$60°$$

$$5$$

$$60°$$

$$10$$

$$30°$$

$$40$$

$45°-45°-90°$ Triangle

 The hypotenuse is $\sqrt{2}$ as long as a leg.

$$45°$$

$$x\sqrt{2}$$

 The two legs are the same size.

$$x$$

$$45°$$

$$x$$

Examples:

$$20\sqrt{2}$$

$$45°$$

$$45°$$

$$45°$$

$$45°$$

$$16$$

$$10\sqrt{3}$$

$$45°$$

$$15$$

$$45°$$

**In a 30o – 60o – 90o triangle:**







**1) the hypotenuse is twice as long as the short leg.**

**2) the long leg is  times the short leg.**

***Fill in the missing sides of the triangle.***

30°

****

b

a

**6**

60°

b

a

1) 2) 3)

30°

**8**

b

a

a = \_\_\_\_\_\_\_\_

b = \_\_\_\_\_\_\_\_

a = \_\_\_\_\_\_\_\_

b = \_\_\_\_\_\_\_\_

a = \_\_\_\_\_\_\_\_

b = \_\_\_\_\_\_\_\_

30°

****

b

a

****

60°

b

a

**4) 5) 6)**

60°

**8**

b

a

a = \_\_\_\_\_\_\_\_

b = \_\_\_\_\_\_\_\_

a = \_\_\_\_\_\_\_\_

b = \_\_\_\_\_\_\_\_

a = \_\_\_\_\_\_\_\_

b = \_\_\_\_\_\_\_\_

7) 8) 9)

30°



b

a

30°

**24**

b

a

60°

**15**

b

a

a = \_\_\_\_\_\_\_\_

b = \_\_\_\_\_\_\_\_

a = \_\_\_\_\_\_\_\_

b = \_\_\_\_\_\_\_\_

a = \_\_\_\_\_\_\_\_

b = \_\_\_\_\_\_\_\_

**In any 45°– 45° – 90° triangle:**

x

x

x****

 **The hypotenuse is  times as long as a leg.**

 **Fill in the missing sides of the triangle.**

a

1) 2) 3)

6

b

a

a



11

45°

y

b

b

45°

a = \_\_\_\_\_\_\_\_

b = \_\_\_\_\_\_\_\_

a = \_\_\_\_\_\_\_\_

b = \_\_\_\_\_\_\_\_

a = \_\_\_\_\_\_\_\_

b = \_\_\_\_\_\_\_\_

4) 5) 6)

a



b

a

a

b



45°

45°



b

a = \_\_\_\_\_\_\_\_

b = \_\_\_\_\_\_\_\_

a = \_\_\_\_\_\_\_\_

b = \_\_\_\_\_\_\_\_

a = \_\_\_\_\_\_\_\_

b = \_\_\_\_\_\_\_\_

a

7) 8) 9)

a



12

a

b

45°

45°



b

b

a = \_\_\_\_\_\_\_\_

b = \_\_\_\_\_\_\_\_

a = \_\_\_\_\_\_\_\_

b = \_\_\_\_\_\_\_\_

a = \_\_\_\_\_\_\_\_

b = \_\_\_\_\_\_\_\_

**Multi-Step Special Right Triangles**

Find the missing side lengths. Leave your answers as radicals in simplest form.

$$45°$$

$$10$$

$$45°$$

$$x$$

$$10$$

$$x$$

$$45°$$

$$45°$$

$$a$$

$$a$$

$$30°$$

$$25$$

$$30°$$

$$25$$

$$y$$

$$45°$$

$$a$$

$$y$$

$$45°$$

**Multi-Step Special Right Triangles Problems**

$$30°$$

$$x$$

$$30°$$

Find the missing side lengths. Leave your answers as radicals in simplest form.

$$10$$

1. 2.

$$x$$

$$45°$$

$$45°$$

$$7$$

3. 4.

$$30°$$

$$x$$

$$30°$$

$$9$$

$$60°$$

$$60°$$

$$4\sqrt{2}$$

5.

$$6$$

$$60°$$

$$x$$

$$45°$$