

(DN) ON BACK OF PACKET

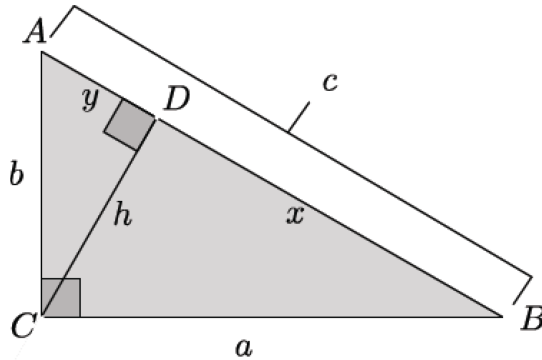
Name \_\_\_\_\_ Per \_\_\_\_\_

LO: I can prove the Pythagorean Theorem using similarity and can solve problems involving 30-60-90 and 45-45-90 right triangles..

(1) Similar Triangles: Proving the Pythagorean Theorem

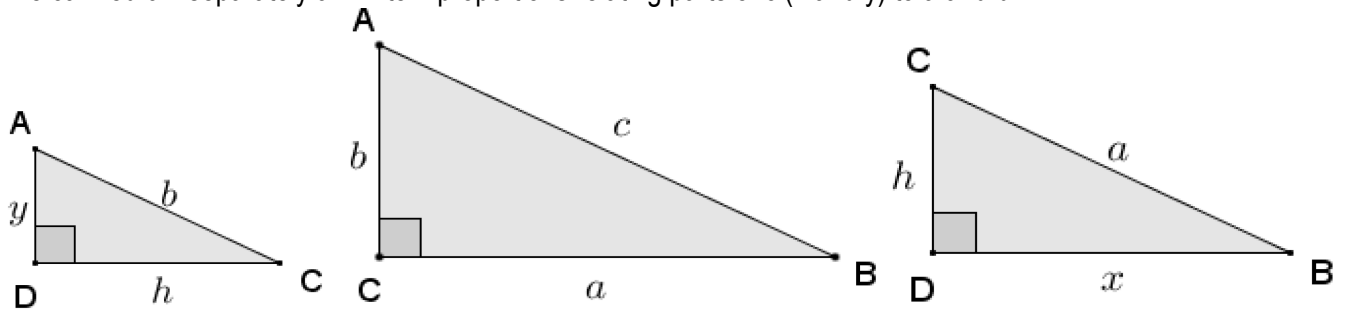
calculator

By drawing altitude CD, we create three \_\_\_\_\_.



NOTE:  $c = \text{_____} + \text{_____}$

We can redraw separately and write 2 proportions relating parts of  $c$  ( $x$  and  $y$ ) to  $a$  and  $b$ .



THE PROOF:

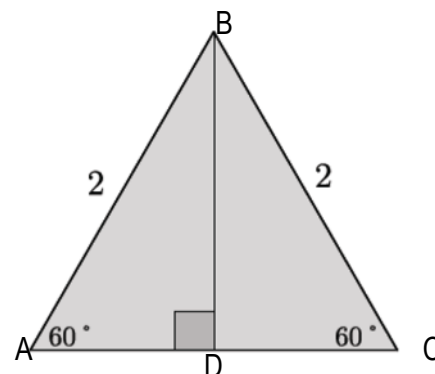
(2)  
calculator

### Similar Triangles: Special right triangles and within triangle ratios

30-60-90 triangles

Triangle ABC below is equilateral. The altitude from vertex B to the opposite side divides the triangle into two right triangles.

(a) Is  $\triangle ABC \cong \triangle CBD$ ? Explain.



(b) What are the lengths of AD and DC? Explain.

(c) Use the Pythagorean Theorem to determine the length of the altitude, BD, in simplest radical form.

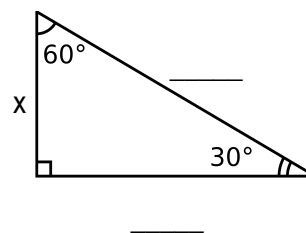
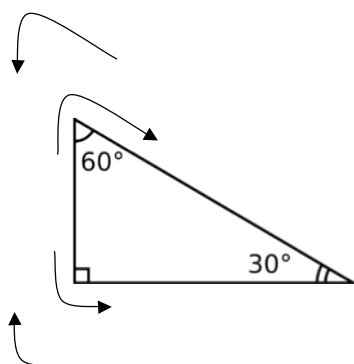
(d) Write each ratio in the chart.

Short leg : Hypotenuse AD:AB	Long leg : Hypotenuse BD:AB	Short leg : Long leg AD:BD

(e) All 30-60-90 triangles will be similar because of \_\_\_\_\_.

If a 30-60-90 triangle has a hypotenuse of length 16, what are the lengths of the legs?

(f) On the diagrams, show how you can find one side length from another just by multiplying.

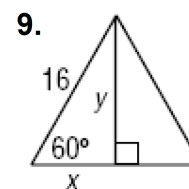
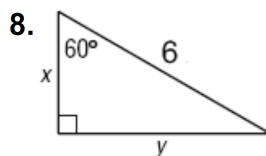
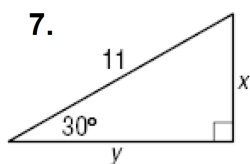
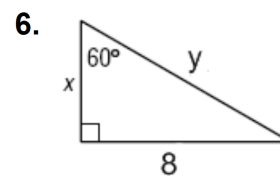
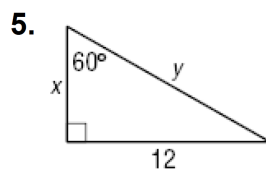
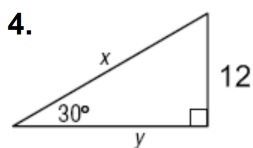
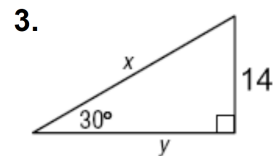
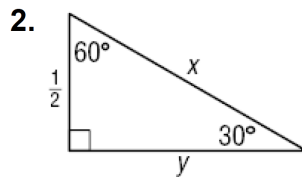
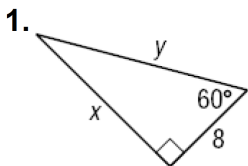


□ (3)  
calculator

### Similar Triangles: Special right triangles and within triangle ratios PRACTICE

### 30-60-90 triangles

Find the value of  $x$  and  $y$  in each triangle.

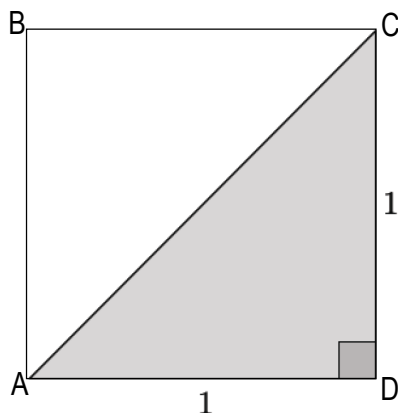


(4)  
calculator

### Similar Triangles: Special right triangles and within triangle ratios

45-45-90 triangles

(a) By drawing diagonal AC in square ABCD, right triangle ACD is formed.



(b) What are the measures of angles ACD and CAD? Explain.

(c) Use the Pythagorean Theorem to determine the length of the hypotenuse, AC, in simplest radical form.

(d) Write each ratio in the chart. (Why are 2 ratios in the same box?)

Leg : Hypotenuse AD:AC or DC:AC	Short leg : Long leg AD:CD

(e) All 45-45-90 triangles will be similar because of \_\_\_\_\_.

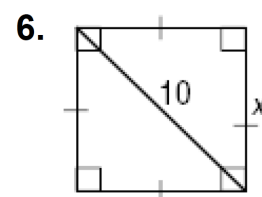
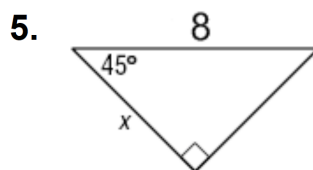
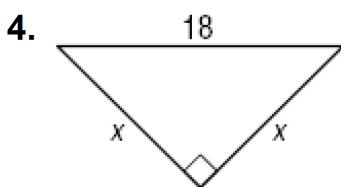
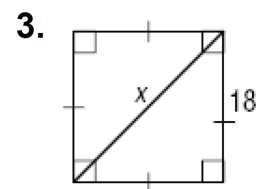
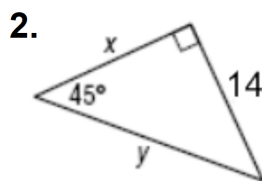
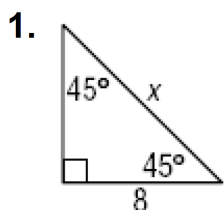
If a 45-45-90 triangle has a hypotenuse of length 20, what are the lengths of the legs?

□ (5)  
calculator

### Similar Triangles: Special right triangles and within triangle ratios PRACTICE

45-45-90 triangles

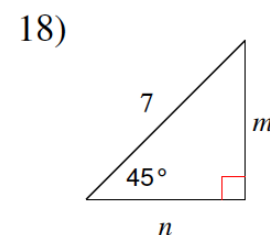
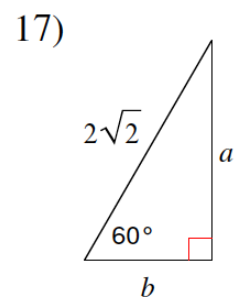
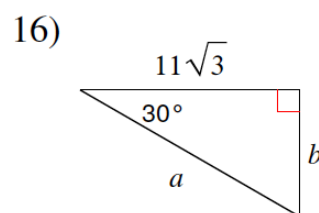
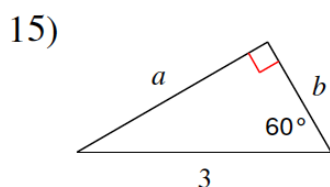
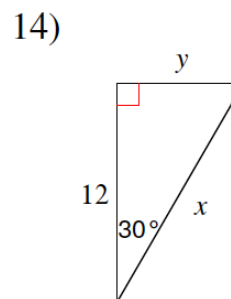
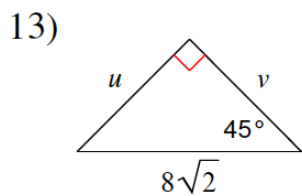
Find the value of  $x$  in each triangle.



□ (6)  
calculator

### Similar Triangles: Special right triangles and within triangle ratios MIXED PRACTICE

Find the measure of each variable.



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 (7) **Exit Ticket**

calculator

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 (8) **Homework**compass  
and  
straightedge

CONSTRUCTION REVIEW.

(a) Construct a  $45^\circ$  angle by first constructing a perpendicular bisector of a segment and then bisecting one of the angles.

(b) Construct a  $30^\circ$  angle by first constructing an equilateral triangle and bisecting one of the angles.

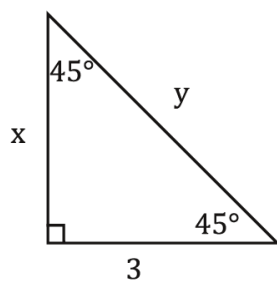
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(8)  
calculator

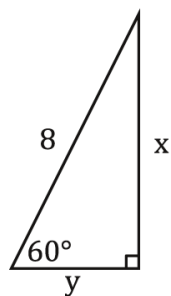
### Homework

Label each special right triangle, and find the missing sides.

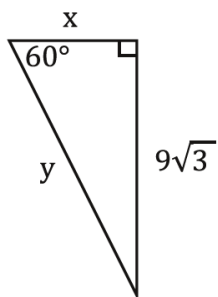
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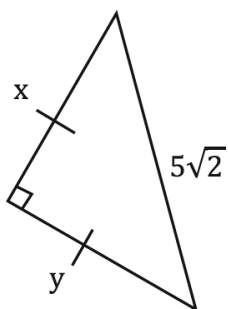
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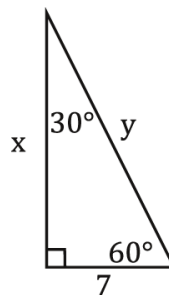
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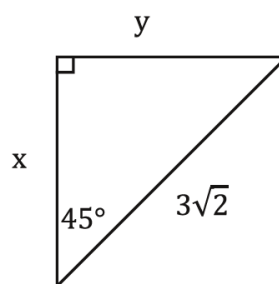
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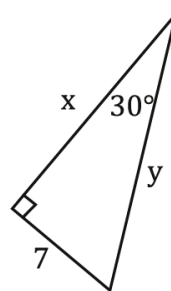
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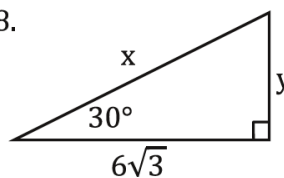
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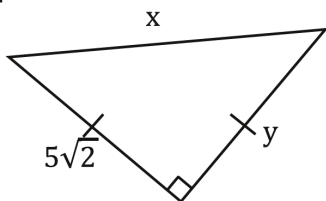
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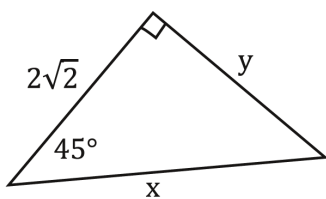
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### Homework

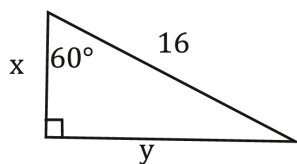
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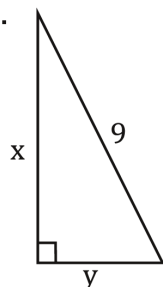
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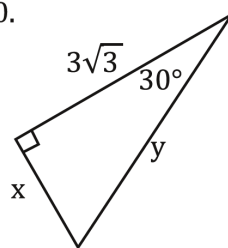
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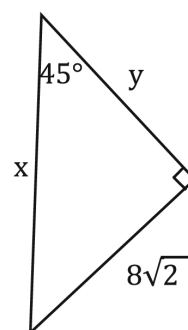
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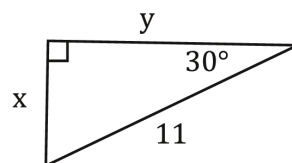
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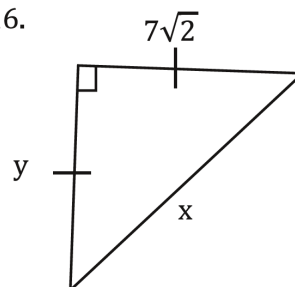
12.



14.



16.





A right triangle has a leg with a length of 18 and a hypotenuse with a length of 36. Bernie notices that the hypotenuse is twice the length of the given leg, and decides it is a 30-60-90 triangle.

(a) How does Bernie know this a 30-60-90 triangle?

(b) Since this is a 30-60-90 triangle, what should the remaining leg length be?

(c) Confirm your answer using the Pythagorean Theorem.

Simplify each expression.

(1)  $\sqrt{150}$

(2)  $\sqrt{3} \cdot \sqrt{18}$

(3)  $\sqrt{72} + \sqrt{50}$

