

# RoundTable

## Geometry

### Special Right Triangles

#### OBJECTIVES

Given a geometric diagram involving right triangles (including 30-60-90 and 45-45-90 triangles), students will find the lengths of various line segments in the diagram. Methods for finding these lengths will include use of special right triangle ratios, geometric means, Pythagorean theorem, and proportions.

#### MATERIALS


Pencils and RoundTable Worksheets (see next pages)

RoundTable Blackline Masters

Special Right Triangles

Names: \_\_\_\_\_

Given:  $\triangle ABC$  is an isosceles right triangle with legs  $AB$  and  $CB$ .  $\angle CAB$  measures  $45^\circ$ , altitude  $CD$  is 8 inches long and  $CD$  is 6 inches long.



Person 1: Find the length of  $AB$  in simplest radical form.

Person 2: Check and initial.

Person 2: Find the length of  $AD$  in simplest radical form.

Person 3: Check and initial.

Person 3: Find the perimeter of  $\triangle ABC$  in simplest radical form.

Person 4: Check and initial.

Person 4: Find the area of  $\triangle ABC$  in simplest radical form.

Person 1: Check and initial.

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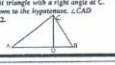
Cooperative Learning Activities for High School Mathematics  
Dina Kushnir

RoundTable Blackline Masters

Special Right Triangles

Names: \_\_\_\_\_

Given:  $\triangle ABC$  is a right triangle with a right angle at  $C$ .  $CD$  is the altitude drawn to the hypotenuse.  $\angle CAD$  measures  $30^\circ$ ,  $AC = 12$ .



Person 1: Find the length of  $AD$  in simplest radical form.

Person 2: Check and initial.

Person 2: Find the length of  $BD$  in simplest radical form.

Person 3: Check and initial.

Person 3: Find the length of  $AB$  in simplest radical form.

Person 4: Check and initial.

Person 4: Find the length of  $BC$  in simplest radical form.

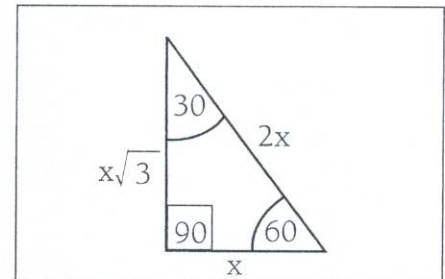
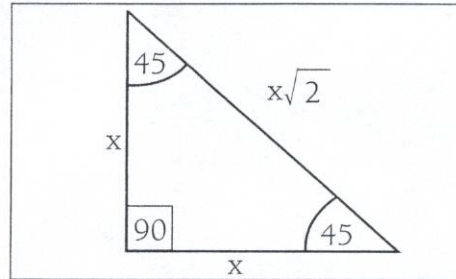
Person 1: Check and initial.

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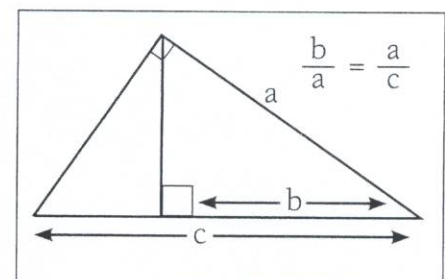
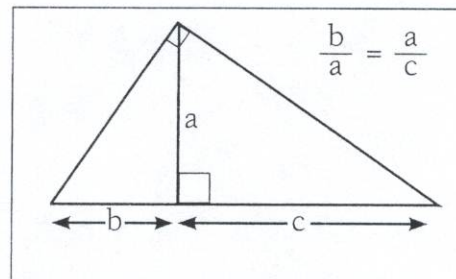
Cooperative Learning Activities for High School Mathematics  
Dina Kushnir

### PREREQUISITE LEARNING

Students need to know the relationships between the sides of 30-60-90 triangles and 45-45-90 triangles, as shown below...



Second, they should be familiar with the proportions which exist when an altitude is drawn to the hypotenuse of a right triangle...



Finally, students should be aware of other geometric problem solving strategies, including use of the Pythagorean theorem and setting up proportions between the corresponding sides of similar triangles.

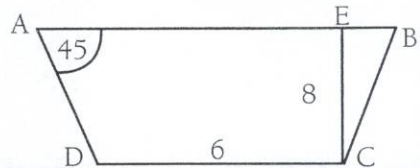
### POSSIBLE EXTENSIONS

The diagrams in these RoundTable activities can be as simple or complex as the teacher sees fit. Other concepts which can be integrated into these activities include right triangle trigonometry, parallel line theorems, circle theorems, and properties of various quadrilaterals.

# Special Right Triangles

Names:

**GIVEN:**  $ABCD$  is an isosceles trapezoid with bases  $\overline{AB}$  and  $\overline{CD}$ .  $\angle DAB$  measures  $45^\circ$ , altitude  $\overline{CE}$  is 8 inches long and  $\overline{CD}$  is 6 inches long...



Person 1: Find the length of  $\overline{EB}$  in simplest radical form.

Person 2 check and initial: \_\_\_\_\_

Person 2: Find the length of  $\overline{AB}$  in simplest radical form.

Person 3 check and initial: \_\_\_\_\_

Person 3: Find the perimeter of  $ABCD$  in simplest radical form.

Person 4 check and initial: \_\_\_\_\_

Person 4: Find the area of  $ABCD$  in simplest radical form.

Person 1 check and initial: \_\_\_\_\_



## Special Right Triangles

Names:

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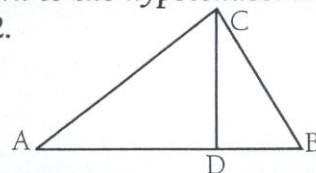


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**GIVEN:**  $ABC$  is a right triangle with a right angle at  $C$ .  
 $\overline{CD}$  is the altitude drawn to the hypotenuse.  $\angle CAD$  measures  $30^\circ$ .  $AC = 12$ .



**Person 1:** Find the length of  $\overline{AD}$  in simplest radical form.

Person 2 check and initial: \_\_\_\_\_

**Person 2:** Find the length of  $\overline{DC}$  in simplest radical form.

Person 3 check and initial: \_\_\_\_\_

**Person 3:** Find the length of  $\overline{DB}$  in simplest radical form.

Person 4 check and initial: \_\_\_\_\_

**Person 4:** Find the length of  $\overline{BC}$  in simplest radical form.

Person 1 check and initial: \_\_\_\_\_

# Special Right Triangles

Names:

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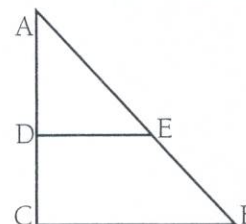


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GIVEN:  $ABC$  is a right triangle  
 with hypotenuse  $\overline{AB}$ .  $\overline{DE}$  is parallel  
 to  $\overline{CB}$ .  $\angle B$  measures  $60^\circ$ ,  
 $DE = 2$ , and  $AC = 3\sqrt{3}$



Person 1: Find the length of  $\overline{AB}$  in simplest radical form.

Person 2 check and initial: \_\_\_\_\_

Person 2: Find the length of  $\overline{CB}$  in simplest radical form.

Person 3 check and initial: \_\_\_\_\_

Person 3: Find the length of  $\overline{AD}$  in simplest radical form.

Person 4 check and initial: \_\_\_\_\_

Person 4: Find the length of  $\overline{DC}$  in simplest radical form.

Person 1 check and initial: \_\_\_\_\_