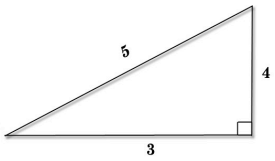
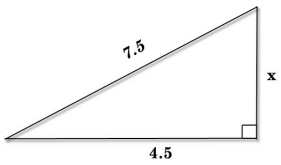
Name: Date:

WORKSHEET :

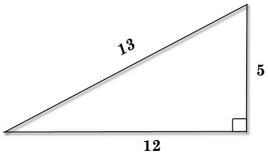
Special Right Triangles

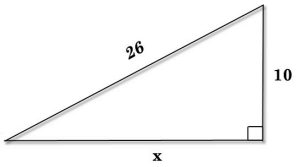
Solve for x: Use Pythagorean triplets (3-4-5, 5-12-13, 8-15-17).



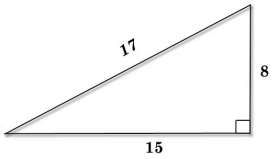


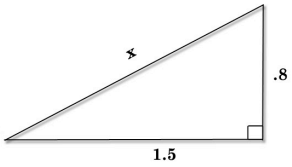
3 - 4 - 5





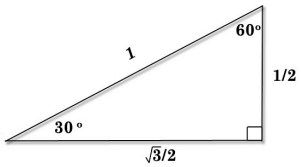
5 - 12 - 13

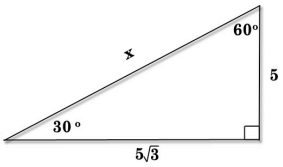




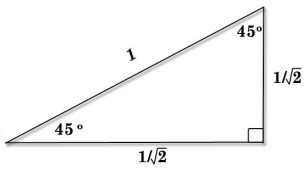
8 - 15 - 17

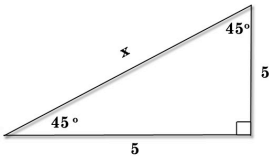
Solve for x: Use special right triangles (from trigonometry 30-60-90, 45-45-90).





30 - 60 - 90



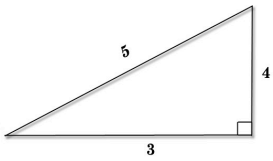


45 - 45- 90

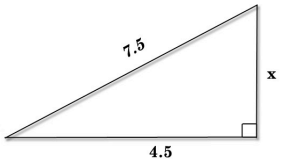
ANSWERS :

Triangle Inequality Theorem

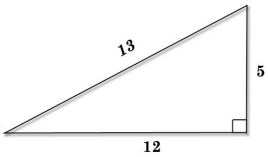
Solve for x: Use Pythagorean triplets (3-4-5, 5-12-13, 8-15-17).



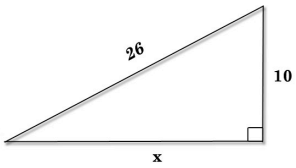
3 - 4 - 5



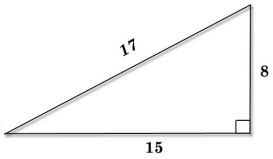
Scale factor = 1.5 for 3-4-5 right triangle
x corresponds to 4 so 1.5 × 4 = 6.0



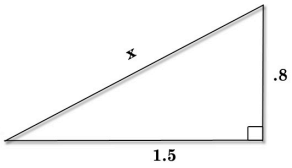
5 - 12 - 13



Scale factor = 2 for 5-12-13 right triangle
x corresponds to 12 so 2 × 12 = 24

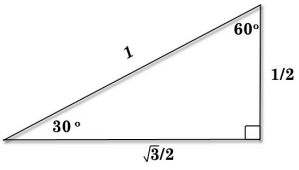


8 - 15 - 17

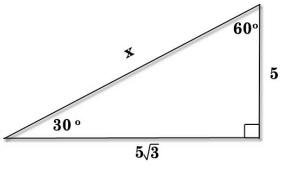


Scale factor = 0.1 for 8-15-17 right triangle
x corresponds to 17 so 0.1 × 17 = 1.7

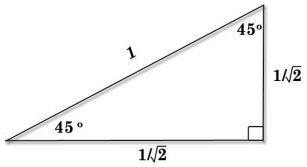
Solve for x: Use special right triangles (from trigonometry 30-60-90, 45-45-90).



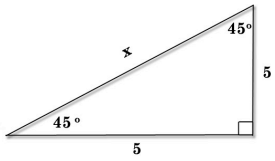
30 - 60 - 90



Scale factor = 10 for 30-60-90 right triangle
x corresponds to 1 so 10 × 1 = 10



45 - 45- 90



Scale factor = $5\sqrt{2}$ for 45-45-90 right triangle

x corresponds to 1 so $5\sqrt{2} \times 1 = 5\sqrt{2}$

KEY CONCEPTS:

The Pythagorean triplets can all be computed using the Pythagorean Theorem, but it saves time to memorize several of the triplets. The 30-60-90 and 45-45-90 special right triangles are arguably more important to memorize and recognize beacuse only one side length may be provided making the Pythagorean Theorem impossible to calculate on its own without recognizing these triangles from the interior angle measures.

1. Typical triplets used for the exam include
   - I. 3-4-5
   - II. 5-12-13
   - III. 8-15-17
   - IV. but there are many others
   - V. If 3 of the 4 elements are provided then the 4th can be derived. Even if 3 side lengths 3, 4, and 5 are given then it must be a right triangle.
   - VI. All side lengths can be scaled. They just must remain in the same ratio.

2. The 30-60-90 and 45-45-90 degree right triangles reference the interior angles of the right triangle. If those are known then the proportion of all 3 sides are known for the right triangle.

   a. The sides opposite the interrior angles have the following relative lengths

   30 - 60 - 90
   1/2 - $\sqrt{3}$/2 - 1

   b. The sides opposite the interrior angles have the following relative lengths

   45 - 45 - 90
   1/$\sqrt{2}$ - 1/$\sqrt{2}$ - 1