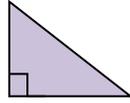


Applied Geometry

Lesson Ch8 D1: Pythagorean Theorem

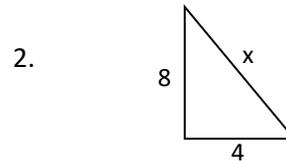
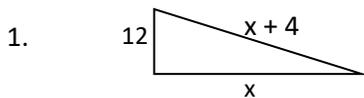
HW Ch8 D1: complete this packet for homework.

Pythagorean Thm: $a^2 + b^2 = c^2$ where a and b are the legs and c is the hypotenuse



Used to find the lengths of a missing side of a RIGHT TRIANGLE.

Examples: For each of the following find the value of x and the length of each side (in simplest radical form).

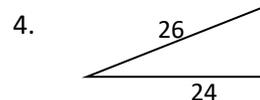
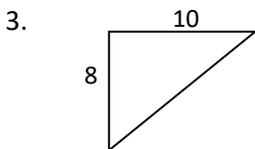


Pythagorean Triples: A set of whole numbers that satisfy the Pythagorean Theorem.

Some common Pythagorean Triples (and their multiples)

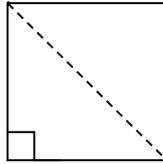
$$\{3, 4, 5\} \{5, 12, 13\} \{8, 15, 17\} \{7, 24, 25\}$$

Find the missing side length. Tell if the side lengths form a Pythagorean Triple. Explain.

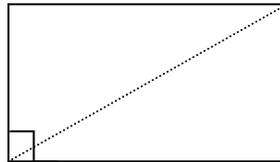


Applying the Pythagorean Theorem to Diagonals and Altitudes:

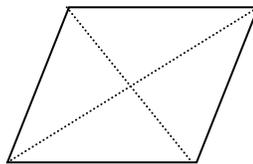
In a SQUARE: Rt. Δ 's are formed by diagonals



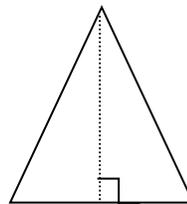
In a RECTANGLE: Rt. Δ 's are formed by diagonals



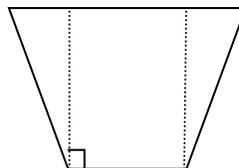
In a RHOMBUS: Diagonals are \perp forming Rt. Δ 's



In an EQUILATERAL TRIANGLE: Altitudes are \perp to base forming Rt. Δ 's



In a TRAPEZOID: the Altitudes are \perp to bases forming Rt. Δ 's

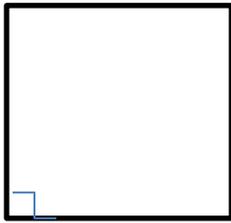


Use the Pythagorean theorem in each of the following to find the missing length. Look for the right triangles and label the hypotenuse. Draw a diagram for each question and label. We will do some for practice in class, other are for you to complete for HW.

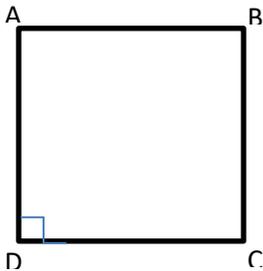
$$a^2 + b^2 = c^2$$

$$\text{leg}^2 + \text{leg}^2 = \text{hypotenuse}^2$$

1. The length of a diagonal of a square is $6\sqrt{2}$ in. Find the length of a side.



2. If the length of a side of a square ABCD is 5 m, find the length of AC. Draw in diagonal AC.



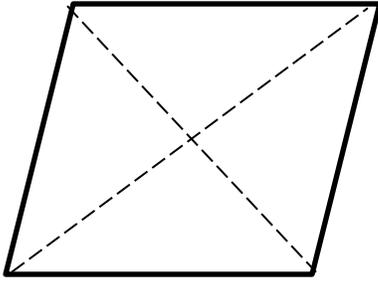
3. If the dimensions of a rectangle are 3 cm by 5 cm, find the length of a diagonal. Draw in the diagonal.



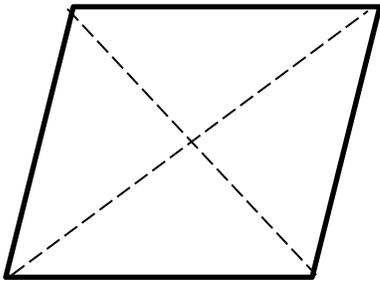
4. A rectangle has a diagonal of length 10 mm and one side of length 6 mm. **What is its perimeter?**



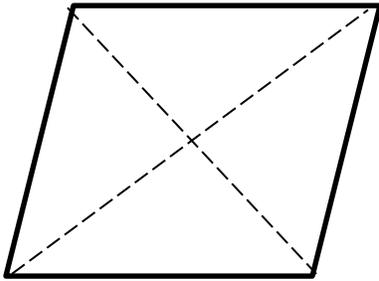
5. The length of each side of a rhombus is 13. If the length of the shorter diagonal is 10, find the length of the longer diagonal.



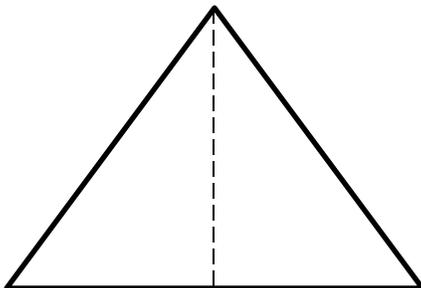
6. If the diagonals of a rhombus measure 6 and 8, find the perimeter.



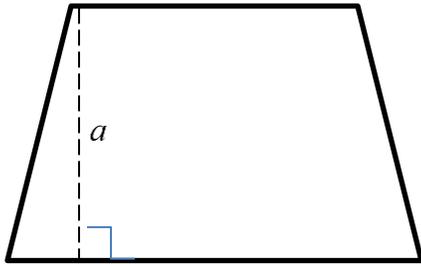
7. A rhombus has a side length of 10ft. and one diagonal of length of 16ft. Find the length of the other diagonal.



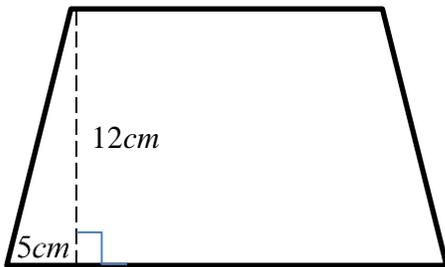
8. What is the length of the altitude of an equilateral triangle whose side measures 4 units?



9. The bases of an isosceles trapezoid measures 15cm and 9cm . Each of the nonparallel sides has a length of 5cm . Find the length of an altitude (a)



10. In the isosceles trapezoid below, find the length of the legs



11. In rectangle ABCD, $AB = x + 7$, $BC = x$, and diagonal $BD = x + 8$. Find BD . Label the diagram and use Pythagorean theorem to solve.

