

PYTHAGOREAN THEOREM

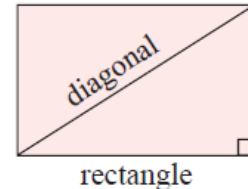
Worksheet nº 4

PROBLEM SOLVING USING PYTHAGORAS' THEOREM

Many practical problems involve triangles. We can apply Pythagoras' theorem to any triangle that is right angled, or use the converse of the theorem to test whether a right angle exists.

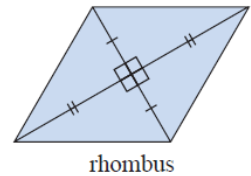
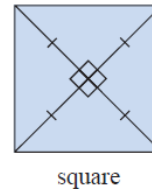
The following figures can be solved using Pythagorean theorem because contain right angled triangles:

- In a rectangle, right angles exist between adjacent sides.

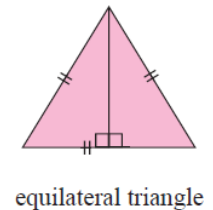
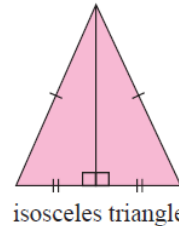


Construct a diagonal to form a right angled triangle.

- In a square and a rhombus, the diagonals bisect each other at right angles.



- In an isosceles triangle and an equilateral triangle, the altitude bisects the base at right angles.



HELPFUL TIPS

- Draw a neat, clear diagram of the situation.
- Mark on known lengths and right angles.
- Use a symbol such x to represent the unknown length.
- Solve the equation.
- Where necessary, write your answer in sentence form.

EXERCISES

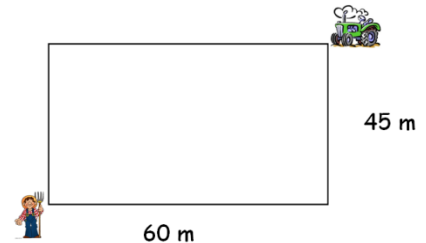
- 1.- The longer side of a rectangle is three times the length of the shorter side. If the length of the diagonal is 10 cm, find the dimensions of the rectangle.
- 2.- A rhombus has side of length 6 cm. One of its diagonals is 10 cm long. Find the length of the other diagonal.
- 3.- A square has diagonals of length 6 cm. Find the length of its sides.
- 4.- A rhombus has diagonals of length 8 cm and 10 cm. Find its perimeter.
- 5.- An equilateral triangle has sides of length 12 cm. Find the length of one of its altitudes.

6.- An **isosceles triangle** has equal sides of length 8 cm and a base of length 6 cm. Find the area of the triangle.

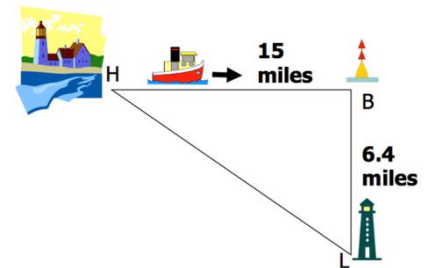
7.- A yacht sails 5 Km due west and then 8 Km due south. **How far** is it from its starting point?

8.- An extension ladder rests 4 m up a wall. If the ladder is extended a **further** 0.8 m without moving the foot of the ladder, then it will now rest 1 m further up the wall. **How long** is extended the ladder?

9.- A farmer has a rectangular field, and must walk from one corner to the **opposite** corner to get to his tractor. **How far** is it?



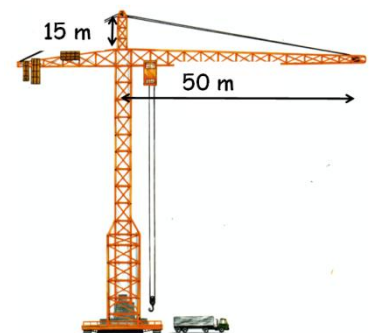
10.- A maintenance boat sails due east from a harbour (H), to a marker buoy (B), 15 miles away. At B the boat turns due south and sails for 6.4 miles to a Lighthouse (L). What is the distance from the harbour to the lighthouse?



11.- Andy's television screen has width 36.6 inches and height 20.6 inches. Andy thinks he has a 46 inch TV. Is he correct?

12.- A plane left Edinburgh Airport. The pilot flew 70 kilometres west. He then flew 55 kilometres due North. **How far** is the plane from Edinburgh Airport?

13.- A crane needs a length of cable replaced. The length of the arm of the crane is 50 m and the height from the arm to the cable is 15 m. **How long** is the cable that needs to be replaced?



14.- What is the screen size of an iPhone 5?

