Learning Enhancement Team

The Dean of Students' Office
Learning Enhancement

Worksheet: Pythagoras' Theorem

This worksheet has questions about Pythagoras' Theorem which defines the association between the sides of a right-angled triangle. Specifically, the square of the hypotenuse is equal to the sum of the squares of the other two sides.

Model solutions to this sheet

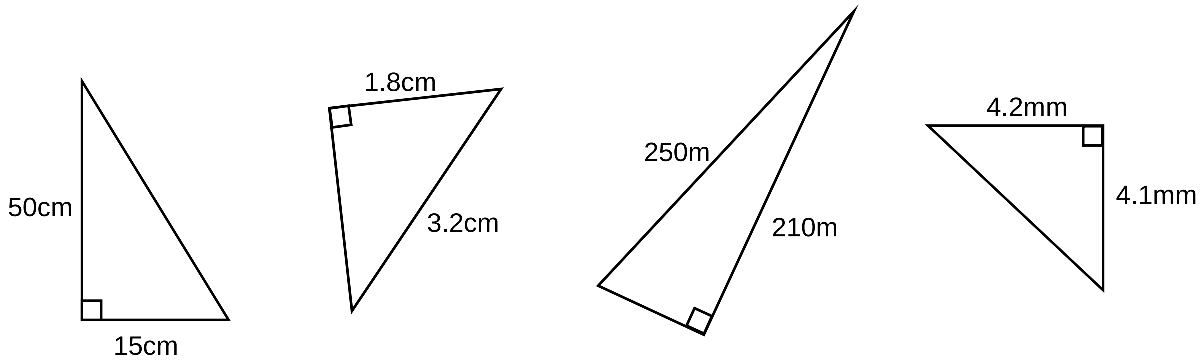
Pythagoras' Theorem study guide

1. If the hypotenuse of a right-angles triangle is given by c and the other two sides are given by a and b, Pythagoras' Theorem is given by $a^2 + b^2 = c^2$. One problem that can arise when using Pythagoras' Theorem is incorrectly rearranging the equation.

(i) Rearrange $a^2 + b^2 = c^2$ for a.
(ii) Rearrange $a^2 + b^2 = c^2$ for b.
(iii) Rearrange $a^2 + b^2 = c^2$ for c.

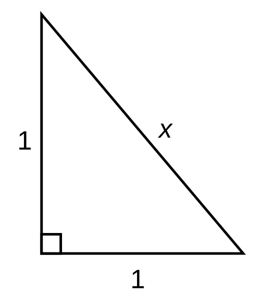
Before carrying on, ensure that you have rearranged the equation correctly in each case.

2. Find the missing side in the following triangles. Give your answers to 2 decimal places.

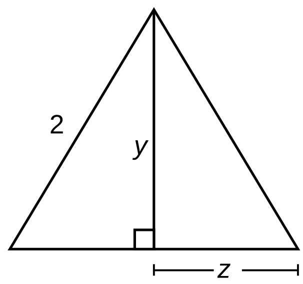


(i) (ii) (iii) (iv)

3. Find the lengths of sides *x*, *y* and *z* in the following triangles. Express your answers as square roots rather than decimal numbers. Triangle (i) is an isosceles triangle and triangle (ii) is equilateral.



(i)



(ii)

4. A Pythagorean Triple is a set of whole number which satisfy Pythagoras' Theorem. The most famous example is $[3,4,5]$ so $3^2+4^2=5^2$. Another example is $[5,12,13]$.

(i) If you double all the numbers in a Pythagorean Triple, do you get another Pythagorean Triple? Check your answer.

(ii) If you treble all the numbers in a Pythagorean Triple, do you get another Pythagorean Triple? Check your answer.

(iii) Try some other multiples (both whole numbers, fractions and decimal numbers). Do you still get Pythagorean Triples?

(iv) Can you show that multiplying each member of a Pythagorean Triple by any number *n* you still get a Pythagorean Triple? Try to write a sound mathematical argument to show this.