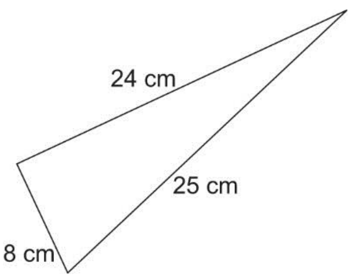
Lesson 1.6: Exploring the Pythagorean Theorem

1. Determine whether each triangle is a right triangle.
Justify your answers.

a)



$a^2 + b^2 \stackrel{?}{=} c^2$

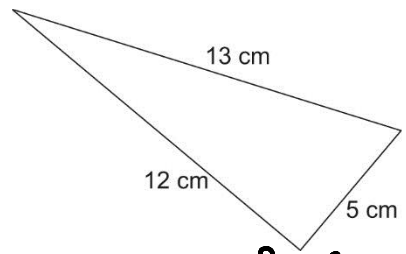
$24^2 + 8^2 \stackrel{?}{=} 25^2$

$576 + 64 \stackrel{?}{=} 625$

$640 \neq 625$

$\therefore$ NOT a right triangle

b)



$a^2 + b^2 \stackrel{?}{=} c^2$

$5^2 + 12^2 \stackrel{?}{=} 13^2$

$25 + 144 \stackrel{?}{=} 169$

$169 = 169$

$\therefore$ it IS a right triangle

2. Each set of measurements below represents the side lengths of a triangle.
Identify which triangles are right triangles.
How do you know?

a) 3 cm, 4 cm, 6 cm

$3^2 + 4^2 \stackrel{?}{=} 6^2$

$9 + 16 \stackrel{?}{=} 36$

$25 \neq 36$

$\therefore$ NOT a right triangle

b) 7 m, 24 m, 25 m

$7^2 + 24^2 \stackrel{?}{=} 25^2$

$49 + 576 \stackrel{?}{=} 625$

$625 = 625$

$\therefore$ it IS a right triangle.

c) 6 cm, 8 cm, 10 cm

$6^2 + 8^2 \stackrel{?}{=} 10^2$

$36 + 64 \stackrel{?}{=} 100$

$100 = 100$

$\therefore$ it IS a R.T.

d) 1 m, 2 m, $\sqrt{5}$ m

$1^2 + 2^2 \stackrel{?}{=} (\sqrt{5})^2$

$1 + 4 \stackrel{?}{=} 5$

$5 = 5$

$\therefore$ it IS a R.T.

e) 2 m, 3 m, $\sqrt{12}$ m

$2^2 + 3^2 \stackrel{?}{=} (\sqrt{12})^2$

$4 + 9 \stackrel{?}{=} 12$

$13 \neq 12$

$\therefore$ NOT a R.T.

3. Which sets of numbers below are Pythagorean triples?

a) 20, 21, 29

$20^2 + 21^2 \overset{?}{=} 29^2$

$400 + 441 \overset{?}{=} 841$

$841 = 841$

$\therefore$ it IS a R.T.

b) 11, 34, 35

$11^2 + 34^2 \overset{?}{=} 35^2$

$121 + 1156 \overset{?}{=} 1225$

$1277 \neq 1225$

$\therefore$ NOT a R.T.

c) 20, 101, 99

$20^2 + 99^2 \overset{?}{=} 101^2$

$400 + 9801 \overset{?}{=} 10201$

$10201 = 10201$

$\therefore$ yes it is a R.T.

d) 30, 34, 16

$30^2 + 16^2 \overset{?}{=} 34^2$

$900 + 256 \overset{?}{=} 1156$

$1156 = 1156$

$\therefore$ it IS a R.T.

4. Two numbers in a Pythagorean triple are 77 and 85.
Find the third number. What is "c"?

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

$77^2 + 85^2 = c^2$

$5929 + 7225 = c^2$

$\sqrt{13154} = \sqrt{c^2}$

$\boxed{c \doteq 114.7}$

5. A triangle has side length of 5 cm, $\sqrt{96}$ cm and 11 cm.

a) Is this triangle a right triangle?

b) Do these side lengths form a Pythagorean triple? Explain.

a) $5^2 + \sqrt{96}^2 \overset{?}{=} 11^2$

$25 + 96 \overset{?}{=} 121$

$121 = 121$

$\therefore$ it IS a R.T.

b) yes they do because they satisfy $a^2 + b^2 = c^2$