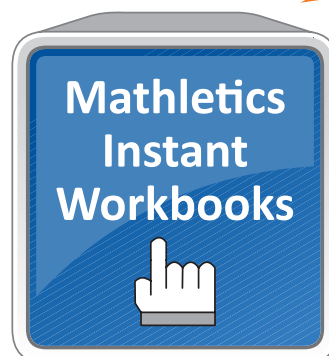
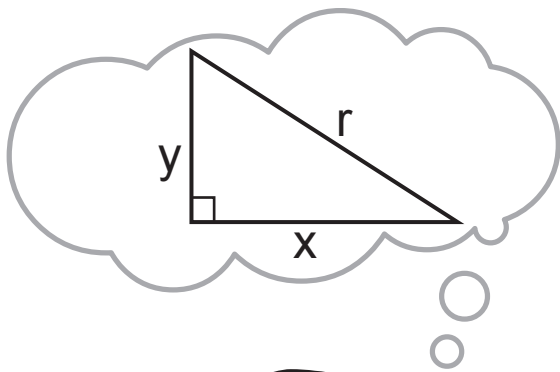


# MATHLETICS

*Inspiring Better Results*

## Pythagoras' Theorem

Student Book - Series I-1



# Pythagoras' theorem

## Student Book - Series I

### Contents

#### Topics

#### Date completed

Topic 1 - Hypotenuse of the right angled triangle	__/__/__
Topic 2 - Naming the sides of a right angled triangle	__/__/__
Topic 3 - Selecting the correct Pythagoras' rule	__/__/__
Topic 4 - Squares, square roots and Pythagorean triads	__/__/__
Topic 5 - Finding the length of the hypotenuse	__/__/__
Topic 6 - Finding the length of one of the other sides	__/__/__
Topic 7 - Miscellaneous questions on Pythagoras' theorem	__/__/__
Topic 8 - Problem solving and Pythagoras' theorem	__/__/__

#### Practice Tests

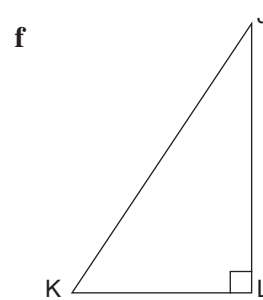
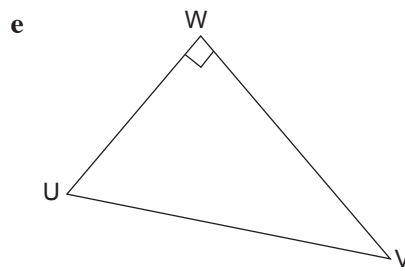
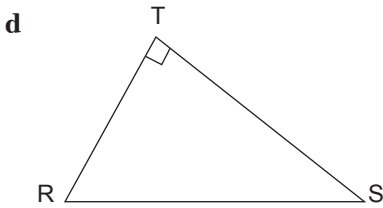
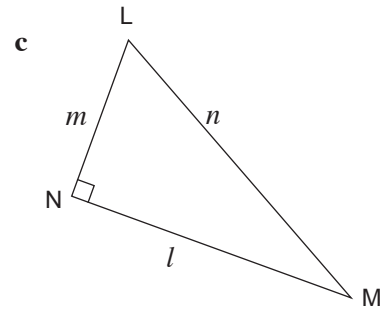
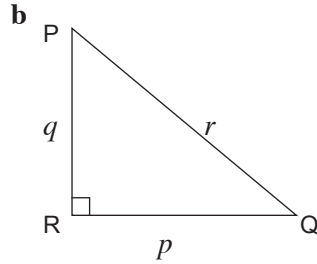
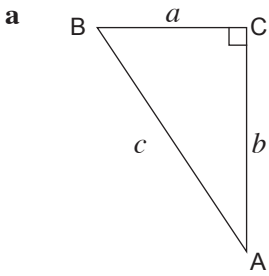
Topic 1 - Topic test A	__/__/__
Topic 2 - Topic test B	__/__/__

Author of The Topics and Topic Tests: AS Kalra

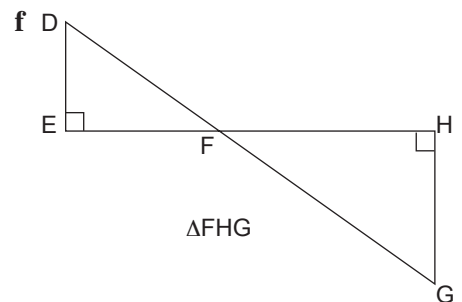
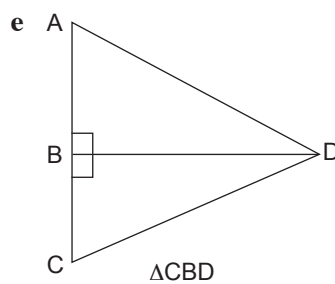
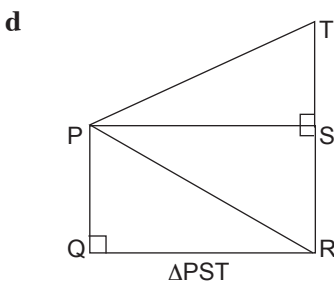
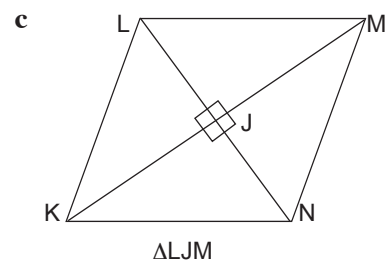
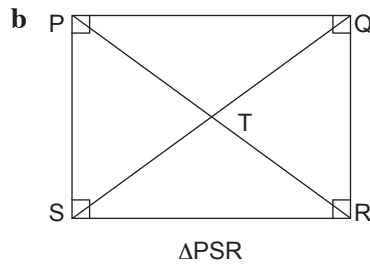
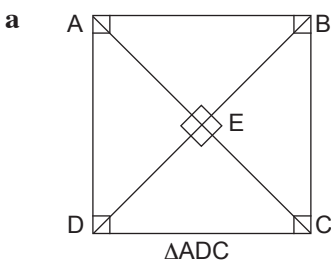
# Pythagoras' theorem

## Topic 1: Hypotenuse of the right angled triangle

QUESTION 1 Name the hypotenuse of each right angled triangle.

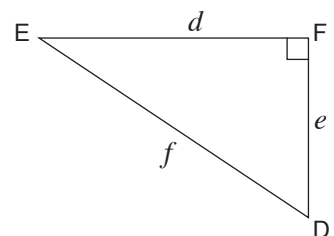


QUESTION 2 Name the hypotenuse of the triangle named below in the diagram.



QUESTION 3 Complete the following statements.

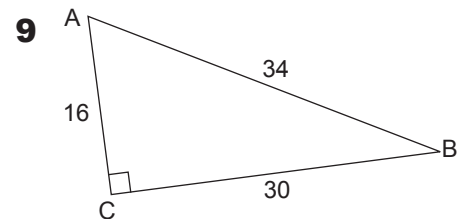
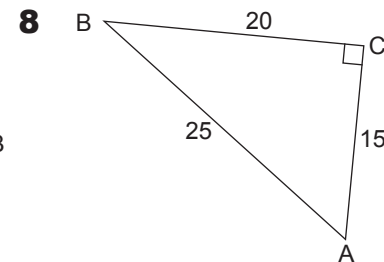
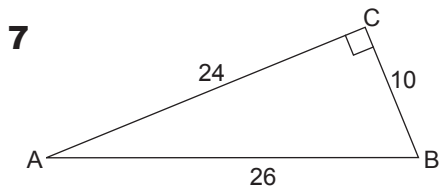
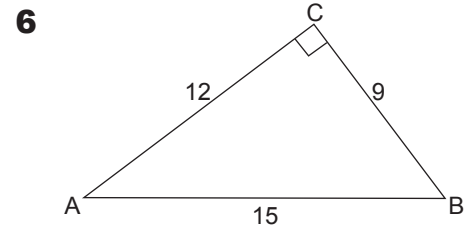
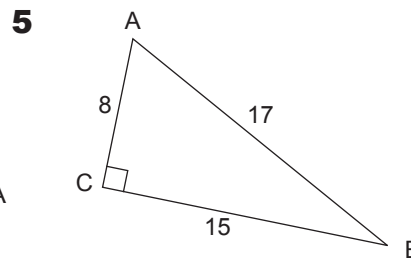
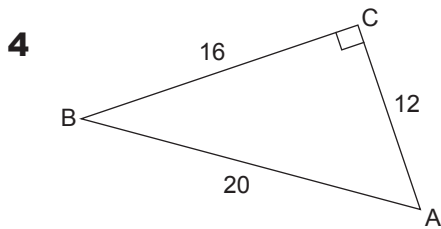
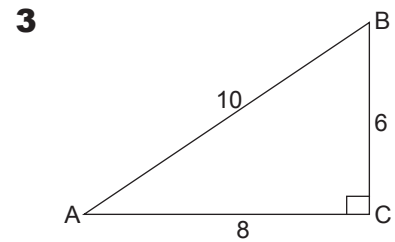
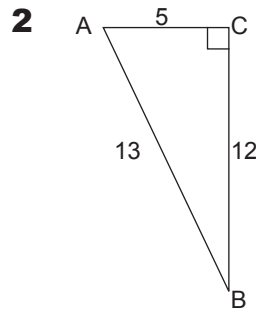
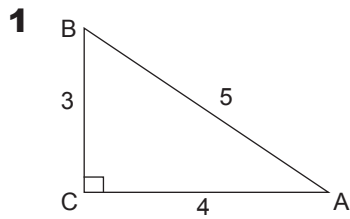
- a \_\_\_\_\_ is the length of the side opposite to angle D.
- b \_\_\_\_\_ is the length of the side opposite to angle E.
- c \_\_\_\_\_ is the length of the side opposite to angle F.
- d \_\_\_\_\_ is the length of the hypotenuse of  $\triangle DEF$ .
- e \_\_\_\_\_ is the area of the square on the side opposite to  $\angle D$ .
- f \_\_\_\_\_ is the area of the square on the side opposite to  $\angle F$ .



# Pythagoras' theorem

## Topic 2: Naming the sides of a right angled triangle

For each of the following triangles, complete the table below and verify that the square on the hypotenuse is equal to the sum of the squares on the other two sides.



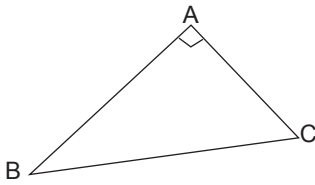
	$a$	$b$	$c$	$a^2$	$b^2$	$c^2$	$a^2 + b^2$
<b>1</b>							
<b>2</b>							
<b>3</b>							
<b>4</b>							
<b>5</b>							
<b>6</b>							
<b>7</b>							
<b>8</b>							
<b>9</b>							

# Pythagoras' theorem

## Topic 3: Selecting the correct Pythagoras' rule

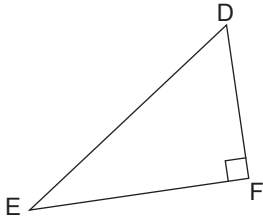
In the following right angled triangles, circle the correct statement.

1



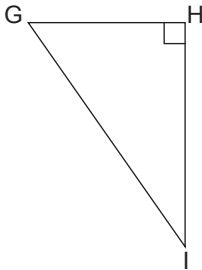
- a  $a^2 = b^2 + c^2$
- b  $b^2 = a^2 + c^2$
- c  $c^2 = a^2 + b^2$

2



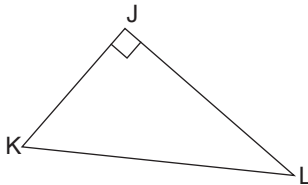
- a  $d^2 = e^2 + f^2$
- b  $e^2 = d^2 + f^2$
- c  $f^2 = d^2 + e^2$

3



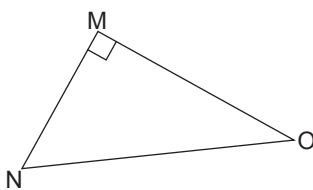
- a  $g^2 = h^2 + i^2$
- b  $h^2 = g^2 + i^2$
- c  $i^2 = g^2 + h^2$

4



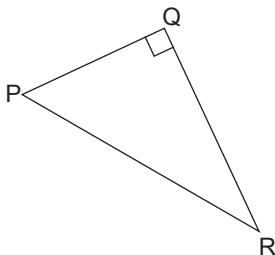
- a  $j^2 = k^2 + l^2$
- b  $k^2 = j^2 + l^2$
- c  $l^2 = j^2 + k^2$

5



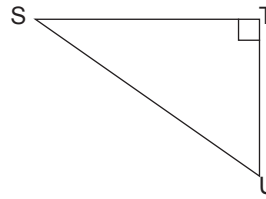
- a  $m^2 = n^2 + o^2$
- b  $n^2 = m^2 + o^2$
- c  $o^2 = m^2 + n^2$

6



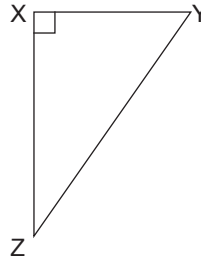
- a  $p^2 = q^2 + r^2$
- b  $q^2 = p^2 + r^2$
- c  $r^2 = p^2 + q^2$

7



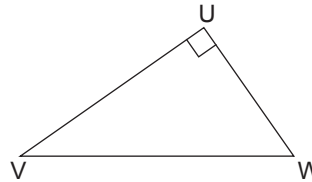
- a  $s^2 = t^2 + u^2$
- b  $t^2 = s^2 + u^2$
- c  $u^2 = s^2 + t^2$

8



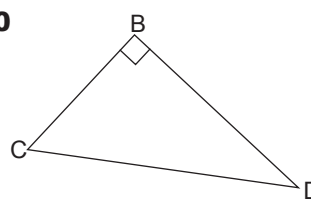
- a  $x^2 = y^2 + z^2$
- b  $y^2 = x^2 + z^2$
- c  $z^2 = x^2 + y^2$

9



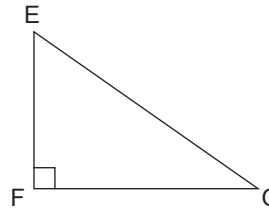
- a  $u^2 = v^2 + w^2$
- b  $v^2 = u^2 + w^2$
- c  $w^2 = u^2 + v^2$

10



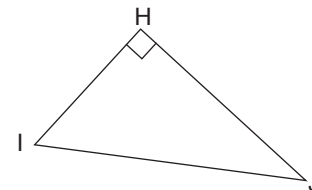
- a  $b^2 = c^2 + d^2$
- b  $c^2 = b^2 + d^2$
- c  $d^2 = b^2 + c^2$

11



- a  $e^2 = f^2 + g^2$
- b  $f^2 = e^2 + g^2$
- c  $g^2 = e^2 + f^2$

12



- a  $h^2 = i^2 + j^2$
- b  $i^2 = h^2 + j^2$
- c  $j^2 = i^2 + h^2$

# Pythagoras' theorem

## Topic 4: Squares, square roots and Pythagorean triads

QUESTION 1 Use your calculator to find the following squares.

- a  $15^2 =$  \_\_\_\_\_ b  $13^2 =$  \_\_\_\_\_ c  $40^2 =$  \_\_\_\_\_  
d  $28^2 =$  \_\_\_\_\_ e  $5^2 =$  \_\_\_\_\_ f  $69^2 =$  \_\_\_\_\_  
g  $10^2 =$  \_\_\_\_\_ h  $17^2 =$  \_\_\_\_\_ i  $81^2 =$  \_\_\_\_\_  
j  $8^2 =$  \_\_\_\_\_ k  $41^2 =$  \_\_\_\_\_ l  $99^2 =$  \_\_\_\_\_

QUESTION 2 Use the square root key to find  $n$ .

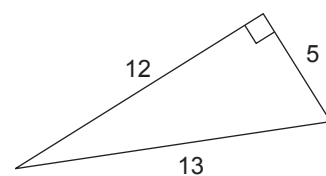
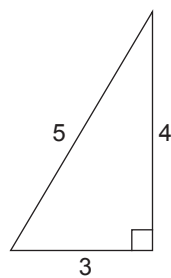
- a  $n^2 = 169$  \_\_\_\_\_ b  $n^2 = 841$  \_\_\_\_\_ c  $n^2 = 576$  \_\_\_\_\_  
d  $n^2 = 4761$  \_\_\_\_\_ e  $n^2 = 100$  \_\_\_\_\_ f  $n^2 = 1444$  \_\_\_\_\_  
g  $n^2 = 144$  \_\_\_\_\_ h  $n^2 = 441$  \_\_\_\_\_ i  $n^2 = 1600$  \_\_\_\_\_  
j  $n^2 = 2809$  \_\_\_\_\_ k  $n^2 = 784$  \_\_\_\_\_ l  $n^2 = 5625$  \_\_\_\_\_

QUESTION 3 Which of the following are Pythagorean triads?

- a {2, 4, 6} \_\_\_\_\_  
\_\_\_\_\_
- b {9, 12, 15} \_\_\_\_\_  
\_\_\_\_\_
- c {9, 40, 41} \_\_\_\_\_  
\_\_\_\_\_
- d {4, 6, 10} \_\_\_\_\_  
\_\_\_\_\_
- e {3, 4, 5} \_\_\_\_\_  
\_\_\_\_\_
- f {8, 13, 17} \_\_\_\_\_  
\_\_\_\_\_
- g {8, 10, 12} \_\_\_\_\_  
\_\_\_\_\_
- h {19, 40, 41} \_\_\_\_\_  
\_\_\_\_\_
- i {6, 8, 10} \_\_\_\_\_  
\_\_\_\_\_
- j {5, 12, 13} \_\_\_\_\_  
\_\_\_\_\_
- k {15, 36, 39} \_\_\_\_\_  
\_\_\_\_\_
- l {8, 15, 17} \_\_\_\_\_  
\_\_\_\_\_

QUESTION 4 Prove that the following triangles are right angled triangles.

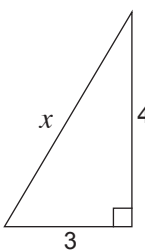
- a \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- b \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

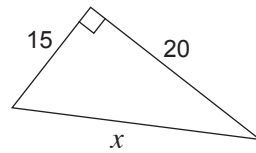


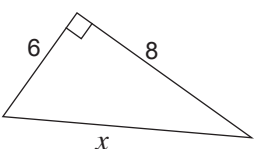
# Pythagoras' theorem

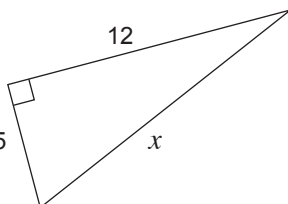
## Topic 5: Finding the length of the hypotenuse

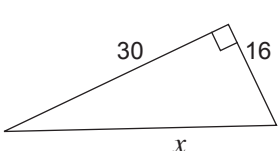
**QUESTION 1** Find the length of the hypotenuse in each of the following. (All measurements are in centimetres.)

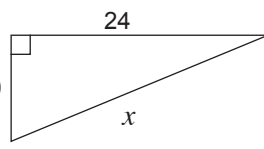
**a**  \_\_\_\_\_  
\_\_\_\_\_

**b**  \_\_\_\_\_  
\_\_\_\_\_

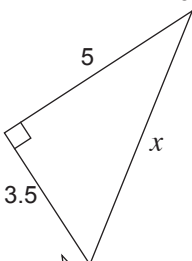
**c**  \_\_\_\_\_  
\_\_\_\_\_

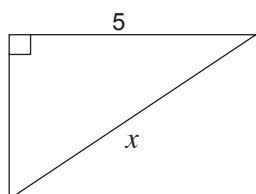
**d**  \_\_\_\_\_  
\_\_\_\_\_

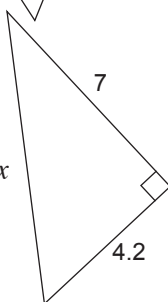
**e**  \_\_\_\_\_  
\_\_\_\_\_

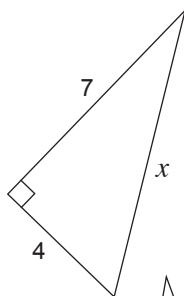
**f**  \_\_\_\_\_  
\_\_\_\_\_

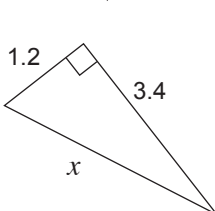
**QUESTION 2** Find the length of the hypotenuse correct to one decimal place. (All measurements are in centimetres.)

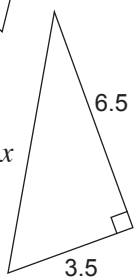
**a**  \_\_\_\_\_  
\_\_\_\_\_

**b**  \_\_\_\_\_  
\_\_\_\_\_

**c**  \_\_\_\_\_  
\_\_\_\_\_

**d**  \_\_\_\_\_  
\_\_\_\_\_

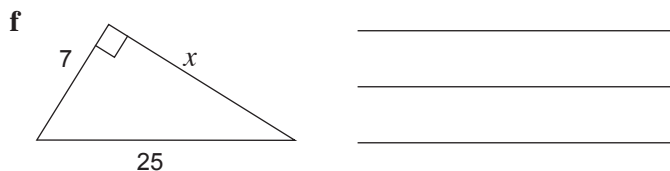
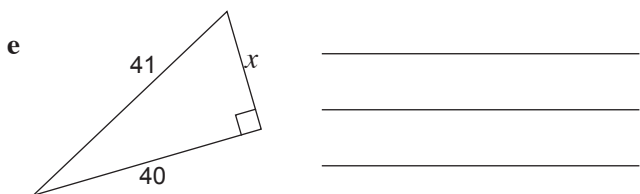
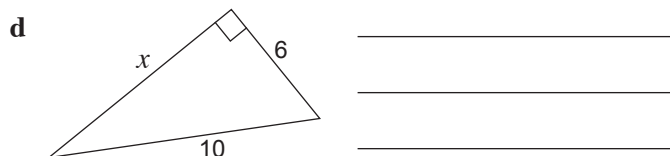
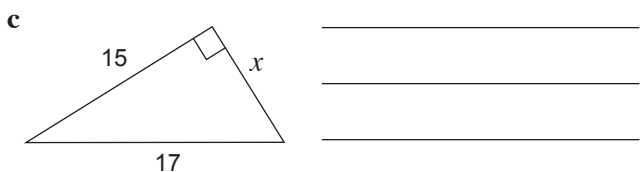
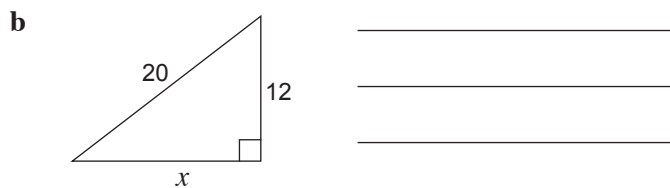
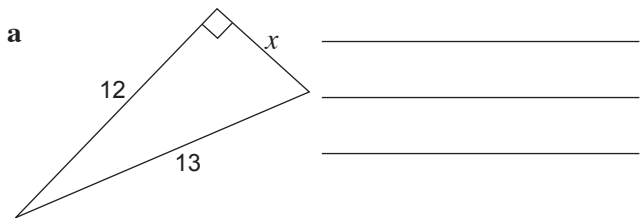
**e**  \_\_\_\_\_  
\_\_\_\_\_

**f**  \_\_\_\_\_  
\_\_\_\_\_

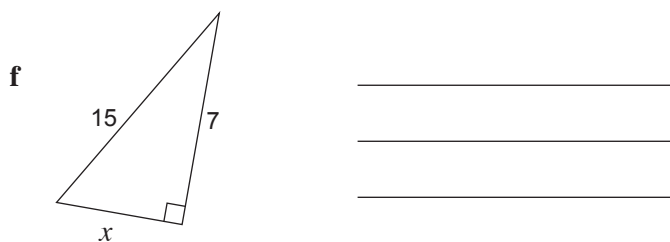
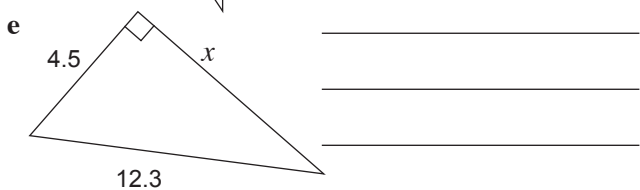
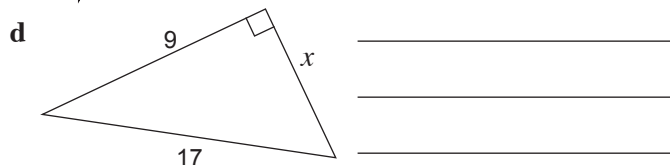
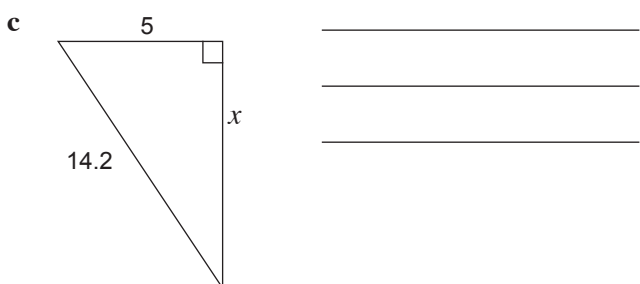
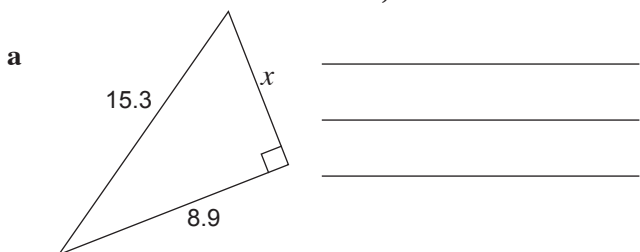
# Pythagoras' theorem

## Topic 6: Finding the length of one of the other sides

**QUESTION 1** In the following triangles, find the length of the unknown sides. (All measurements are in centimetres.)



**QUESTION 2** Find the length of the unknown side correct to one decimal place. (All measurements are in centimetres.)

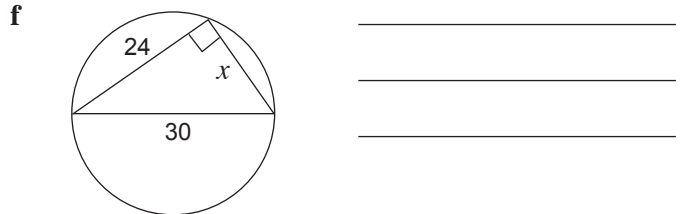
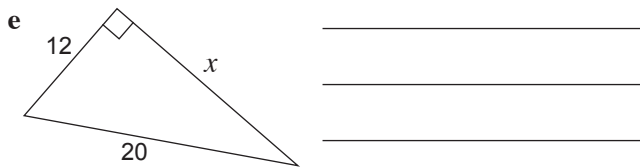
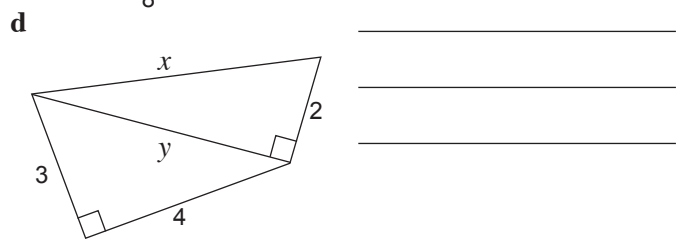
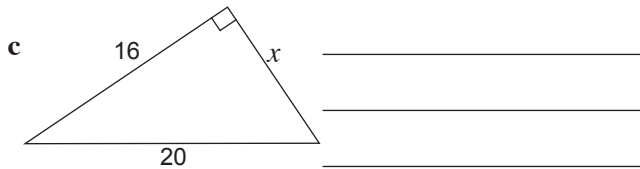
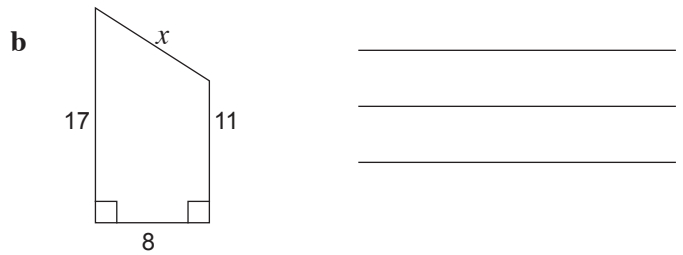
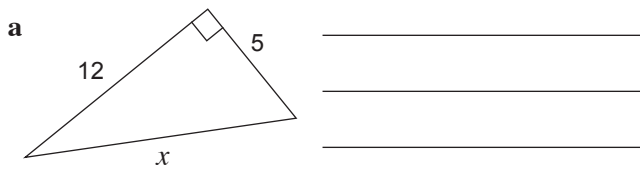




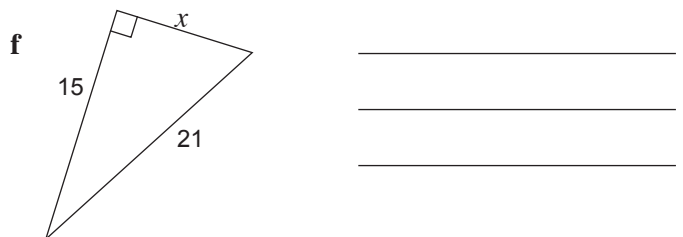
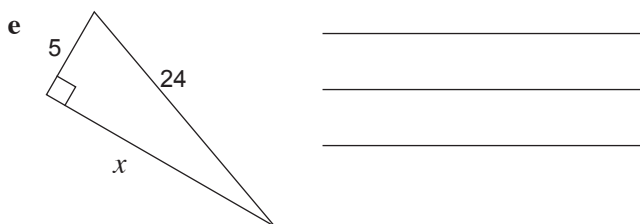
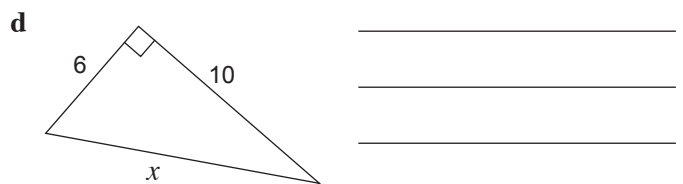
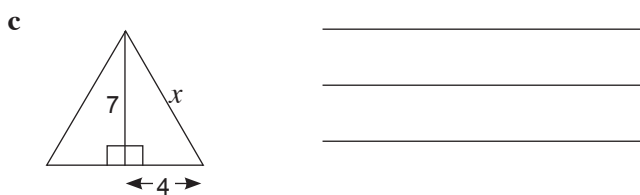
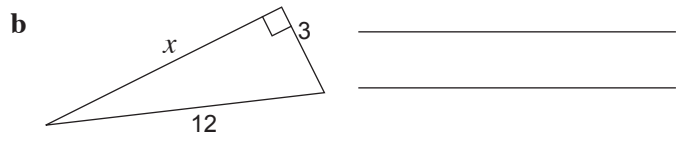
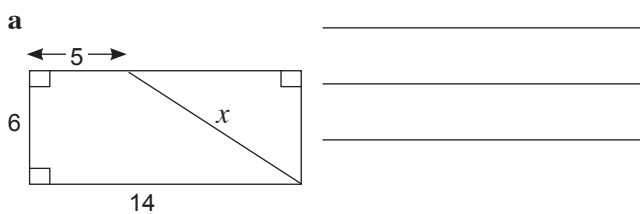
# Pythagoras' theorem

## Topic 7: Miscellaneous questions on Pythagoras' theorem

**QUESTION 1** In each of the following, find the length of the unknown sides (All measurements are in centimetres.)



**QUESTION 2** Find the length of the unknown side correct to two decimal places. (All measurements are in centimetres.)

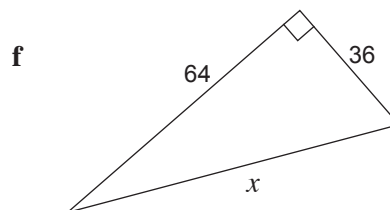
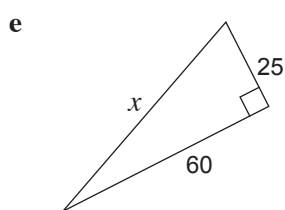
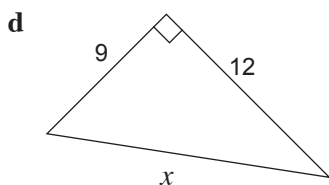
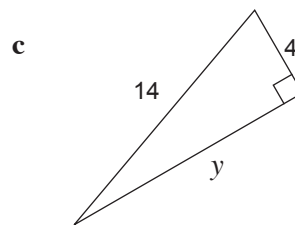
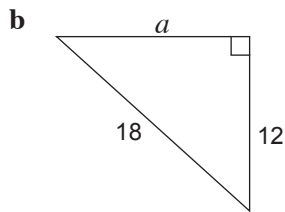
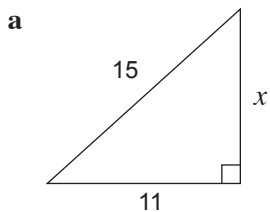


# Pythagoras' theorem

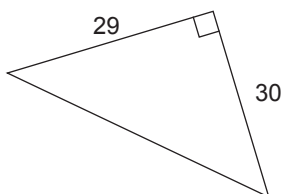
## Topic 8: Problem solving and Pythagoras' theorem

- 1 Find the length of the diagonal of a square of side length 5 cm. \_\_\_\_\_
- 2 Find the length of the diagonal of a rectangle of length 35 cm and width 12 cm.  
\_\_\_\_\_
- 3 What is the altitude of an equilateral triangle whose sides are each 16 cm long?  
Give your answer correct to two decimal places. \_\_\_\_\_
- 4 A 15 metre ladder rests against a wall and its foot is 4 metres away from the base of the wall. How high does it reach up the wall? Give your answer correct to two decimal places.  
\_\_\_\_\_
- 5 The sides of a rectangle are 12 cm and 6 cm. Find the length of the diagonal.  
Give your answer correct to one decimal place.  
\_\_\_\_\_
- 6 The hypotenuse of a right angled triangle is 30 cm. If one of the shorter sides is 18 cm, find the length of the other side.  
\_\_\_\_\_
- 7 In a right angled triangle, the longest side is 39 cm and the shortest side is 15 cm. Find the length of the third side.  
\_\_\_\_\_

8 Find the length of the unknown side in each of the following triangles, correct to two decimal places. (All measurements are in centimetres.)



9 Find the perimeter of the triangle below (correct to one decimal place) by finding the hypotenuse first.



\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# Pythagoras' theorem

## Topic Test

## PART A

**Instructions** This part consists of 12 multiple-choice questions  
Each question is worth 1 mark  
Fill in only ONE CIRCLE for each question  
Calculators are NOT allowed

**Time allowed: 15 minutes**

**Total marks = 12**

	<b>Marks</b>
<b>1</b> A triangle is said to satisfy the rule $c^2 = a^2 + b^2$ for which special triangle? (A) acute angled      (B) right angled      (C) obtuse angled      (D) none of these	1
<b>2</b> The longest side of a right angled triangle is called the (A) shortest side      (B) middle side      (C) hypotenuse      (D) none of these	1
<b>3</b> Given that $c^2 = a^2 + b^2$ and $a = 8$ , $b = 15$ , what is the value of $c$ ? (A) 17      (B) 23      (C) 289      (D) 529	1
<b>4</b> Pythagoras' theorem can be applied to (A) acute angled triangles      (B) obtuse angled triangles (C) right angled triangles      (D) any triangle	1
<b>5</b> The hypotenuse of a right angled triangle is 17 cm. If one side is 15 cm, the third side is (A) 14 cm      (B) 12 cm      (C) 10 cm      (D) 8 cm	1
<b>6</b> If two sides of a right angled triangle are 2.4 m and 1 m then the hypotenuse is (A) 2.4 m      (B) 2.6 m      (C) 3.4 m      (D) 3.8 m	1
<b>7</b> The Pythagorean result for a triangle ABC right angled at C is (A) $a^2 = b^2 + c^2$ (B) $b^2 = a^2 + c^2$ (C) $c^2 = a^2 + b^2$ (D) none of these	1
<b>8</b> The hypotenuse of a right angled triangle is opposite to the (A) acute angle      (B) right angle      (C) obtuse angle      (D) none of these	1
<b>9</b> If two shorter sides of a right angled triangle are 7 m and 8 m, then the hypotenuse is (A) $\sqrt{65}$ (B) $\sqrt{85}$ (C) $\sqrt{113}$ (D) $\sqrt{193}$	1
<b>10</b> In a triangle ABC right angled at C, the hypotenuse is named as (A) $a$ (B) $b$ (C) $c$ (D) none of these	1
<b>11</b> If two sides of a right angled triangle are 6 cm and 8 cm, then the hypotenuse is (A) 10 cm      (B) 9.4 cm      (C) 12 cm      (D) 14 cm	1
<b>12</b> If $n^2 = 2304$ then $n$ equals (A) 38      (B) 42      (C) 48      (D) 52	1

**Total marks achieved for PART A**

12

# Pythagoras' theorem

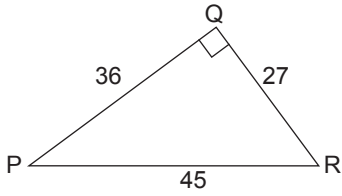
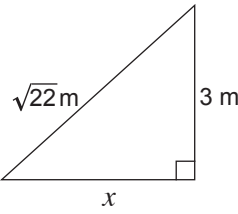
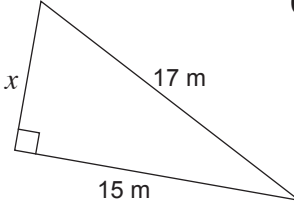
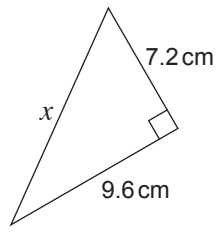
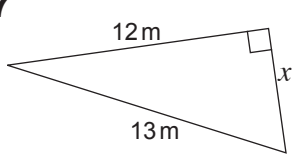
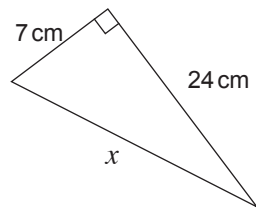
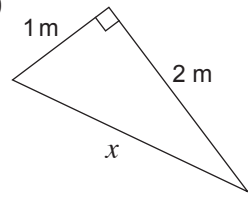
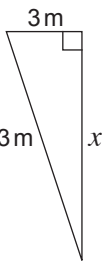
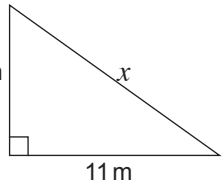
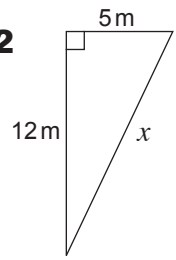
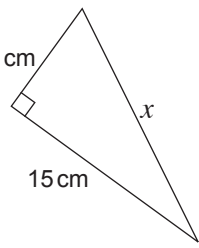
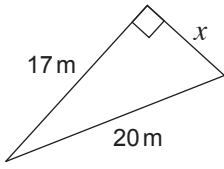
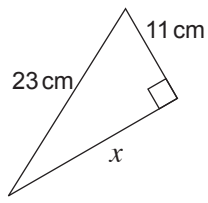
## Topic Test

## PART B

**Instructions** This part consists of 15 questions  
 Each question is worth 1 mark  
 Write answers in the answers-only column

**Time allowed: 20 minutes**

**Total marks = 15**

Questions	Answers only	Marks
<p><b>1</b> If <math>n^2 = 3844</math> then find the value of <math>n</math></p>	<b>1</b> _____	1
<p><b>2</b> Is <math>\{6, 8, 10\}</math> a Pythagorean triad?</p>	<b>2</b> _____	1
<p><b>3</b> Prove that <math>\triangle PQR</math> is a right angled triangle.</p> 	<b>3</b> _____	1
<p>Find the length of the unknown side in the following triangles correct to two decimal places.</p>		
<p><b>4</b></p> 	<b>4</b> _____	1
<p><b>5</b></p> 	<b>5</b> _____	1
<p><b>6</b></p> 	<b>6</b> _____	1
<p><b>7</b></p> 	<b>7</b> _____	1
<p><b>8</b></p> 	<b>8</b> _____	1
<p><b>9</b></p> 	<b>9</b> _____	1
<p><b>10</b></p> 	<b>10</b> _____	1
<p><b>11</b></p> 	<b>11</b> _____	1
<p><b>12</b></p> 	<b>12</b> _____	1
<p><b>13</b></p> 	<b>13</b> _____	1
<p><b>14</b></p> 	<b>14</b> _____	1
<p><b>15</b></p> 	<b>15</b> _____	1

**Total marks achieved for PART B**

15
----