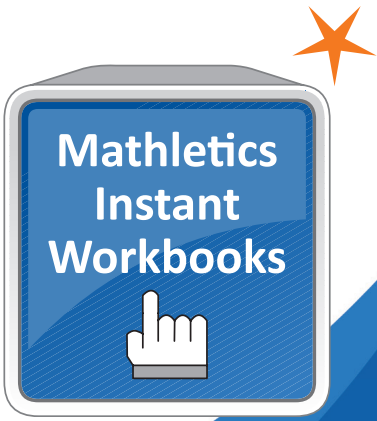
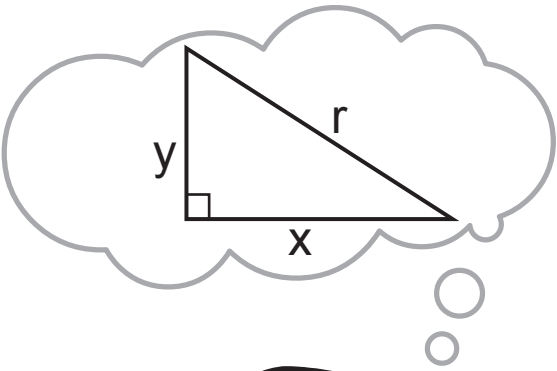


Pythagoras' Theorem

Student Book - Series I-1



Pythagoras' theorem

Student Book - Series I

Contents

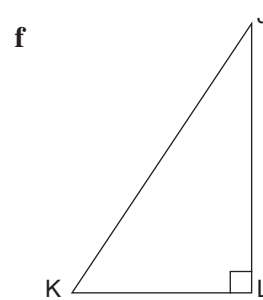
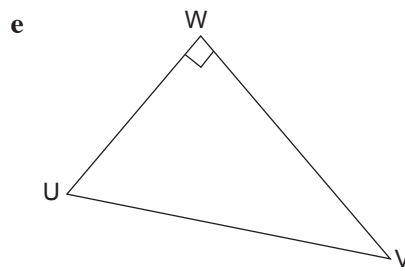
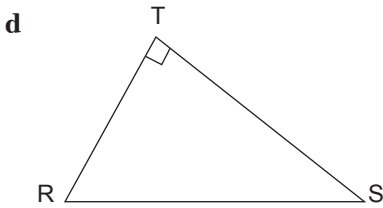
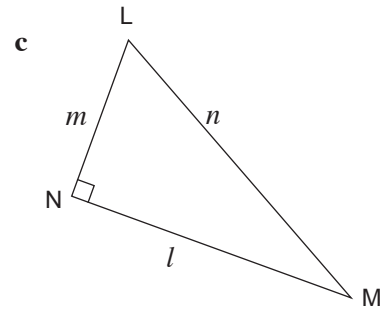
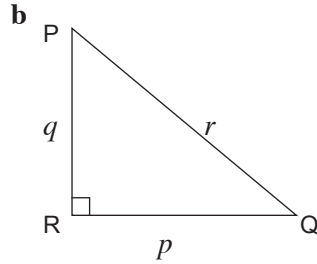
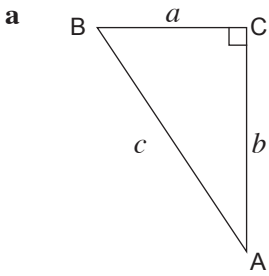
Topics	Date completed
Topic 1 - Hypotenuse of the right angled triangle	__/__/__
Topic 2 - Naming the sides of a right angled triangle	__/__/__
Topic 3 - Selecting the correct Pythagoras' rule	__/__/__
Topic 4 - Squares, square roots and Pythagorean triads	__/__/__
Topic 5 - Finding the length of the hypotenuse	__/__/__
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Topic 7 - Miscellaneous questions on Pythagoras' theorem	__/__/__
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Practice Tests	
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Topic 2 - Topic test B	__/__/__

Author of The Topics and Topic Tests: AS Kalra

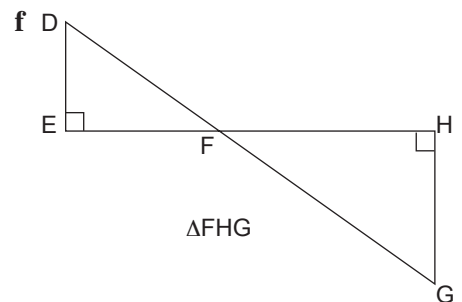
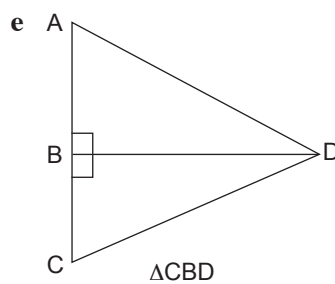
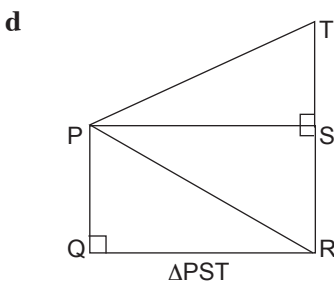
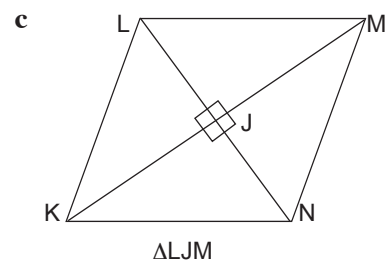
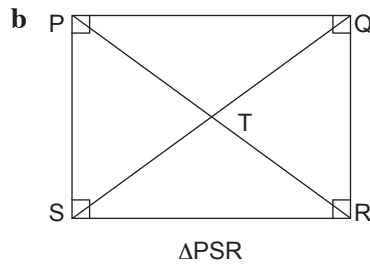
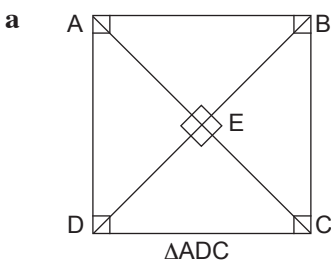
Pythagoras' theorem

Topic 1: Hypotenuse of the right angled triangle

QUESTION 1 Name the hypotenuse of each right angled triangle.

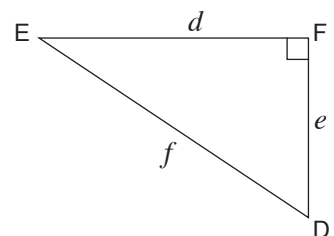


QUESTION 2 Name the hypotenuse of the triangle named below in the diagram.



QUESTION 3 Complete the following statements.

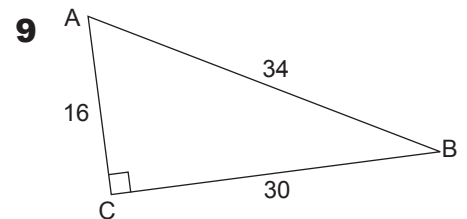
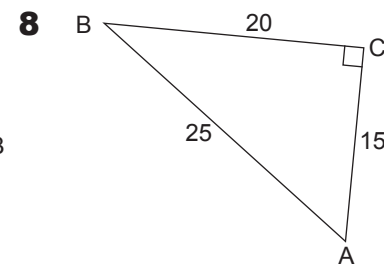
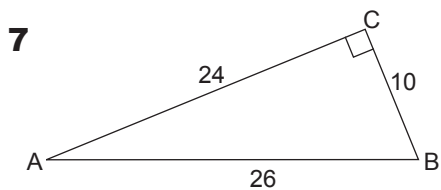
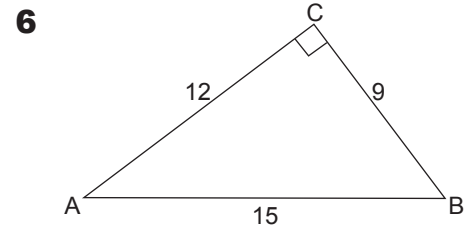
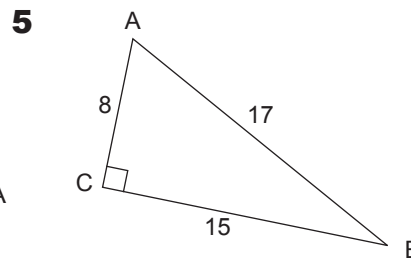
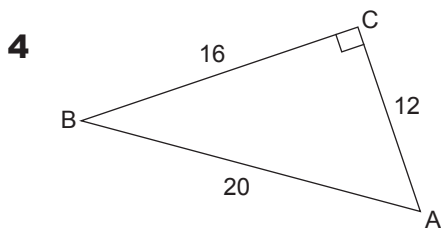
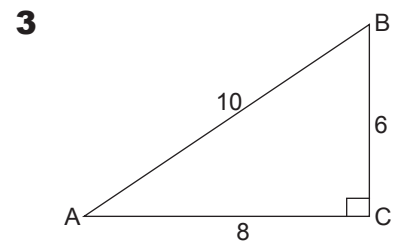
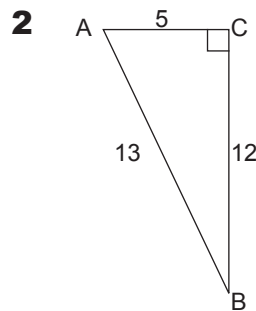
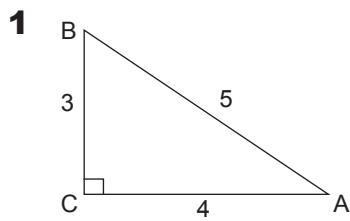
- a _____ is the length of the side opposite to angle D.
- b _____ is the length of the side opposite to angle E.
- c _____ is the length of the side opposite to angle F.
- d _____ is the length of the hypotenuse of $\triangle DEF$.
- e _____ is the area of the square on the side opposite to $\angle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



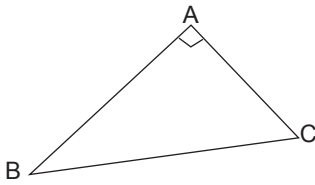
	a	b	c	a^2	b^2	c^2	$a^2 + b^2$
1							
2							
3							
4							
5							
6							
7							
8							
9							

Pythagoras' theorem

Topic 3: Selecting the correct Pythagoras' rule

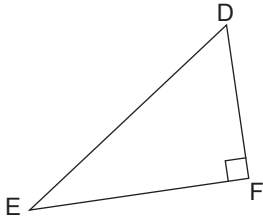
In the following right angled triangles, circle the correct statement.

1



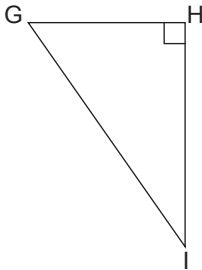
- a $a^2 = b^2 + c^2$
- b $b^2 = a^2 + c^2$
- c $c^2 = a^2 + b^2$

2



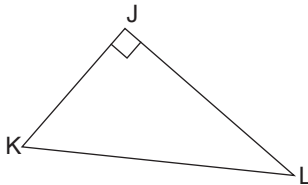
- a $d^2 = e^2 + f^2$
- b $e^2 = d^2 + f^2$
- c $f^2 = d^2 + e^2$

3



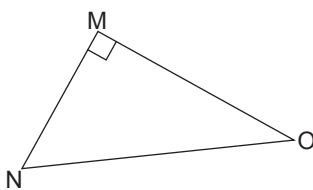
- a $g^2 = h^2 + i^2$
- b $h^2 = g^2 + i^2$
- c $i^2 = g^2 + h^2$

4



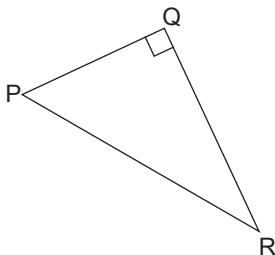
- a $j^2 = k^2 + l^2$
- b $k^2 = j^2 + l^2$
- c $l^2 = j^2 + k^2$

5



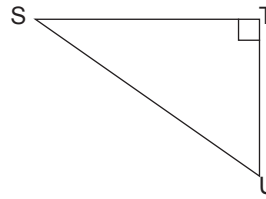
- a $m^2 = n^2 + o^2$
- b $n^2 = m^2 + o^2$
- c $o^2 = m^2 + n^2$

6



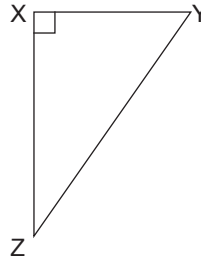
- a $p^2 = q^2 + r^2$
- b $q^2 = p^2 + r^2$
- c $r^2 = p^2 + q^2$

7



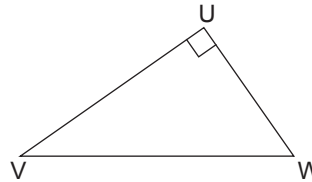
- a $s^2 = t^2 + u^2$
- b $t^2 = s^2 + u^2$
- c $u^2 = s^2 + t^2$

8



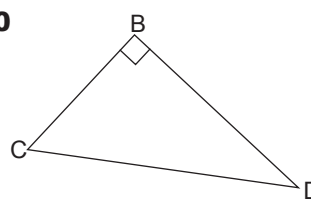
- a $x^2 = y^2 + z^2$
- b $y^2 = x^2 + z^2$
- c $z^2 = x^2 + y^2$

9



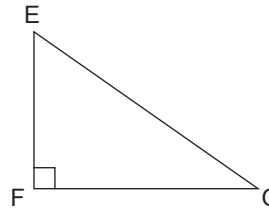
- a $u^2 = v^2 + w^2$
- b $v^2 = u^2 + w^2$
- c $w^2 = u^2 + v^2$

10



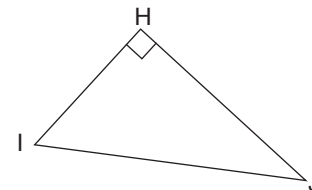
- a $b^2 = c^2 + d^2$
- b $c^2 = b^2 + d^2$
- c $d^2 = b^2 + c^2$

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} _____

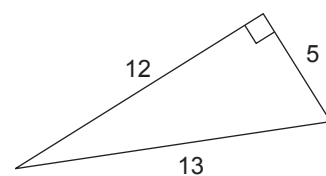
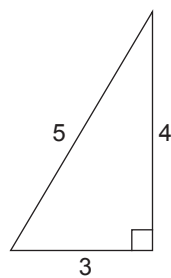
- k {15, 36, 39} _____

- l {8, 15, 17} _____

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

- a _____

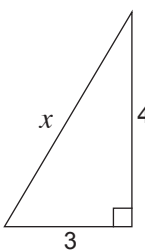
- b _____

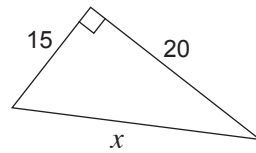


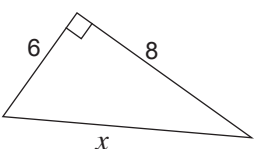
Pythagoras' theorem

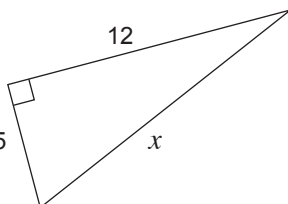
Topic 5: Finding the length of the hypotenuse

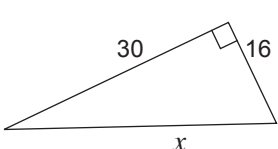
QUESTION 1 Find the length of the hypotenuse in each of the following. (All measurements are in centimetres.)

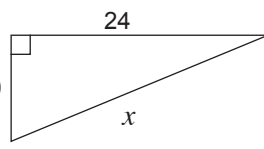
a  _____

b  _____

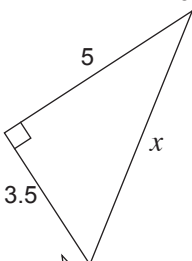
c  _____

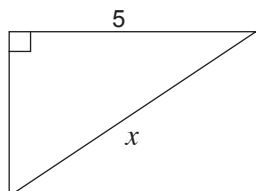
d  _____

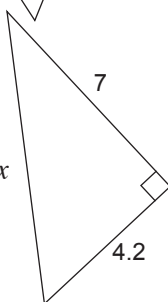
e  _____

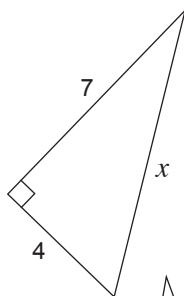
f  _____

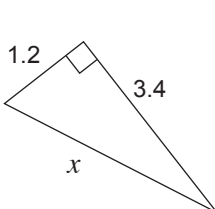
QUESTION 2 Find the length of the hypotenuse correct to one decimal place. (All measurements are in centimetres.)

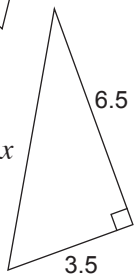
a  _____

b  _____

c  _____

d  _____

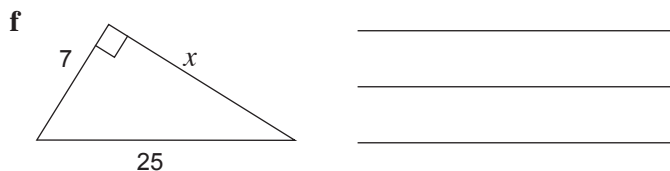
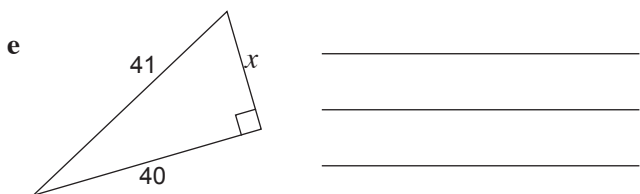
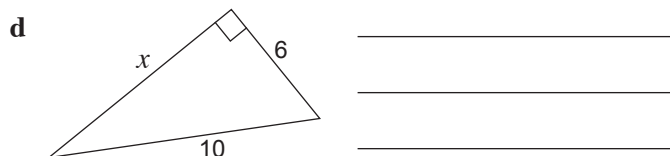
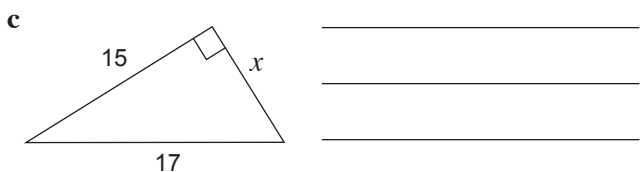
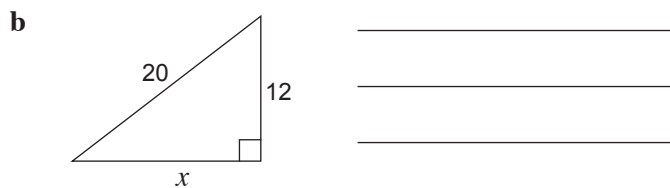
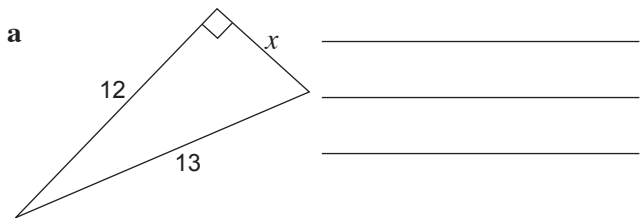
e  _____

f  _____

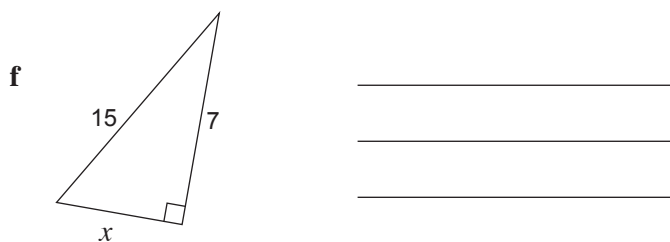
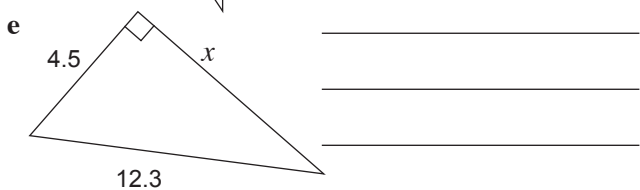
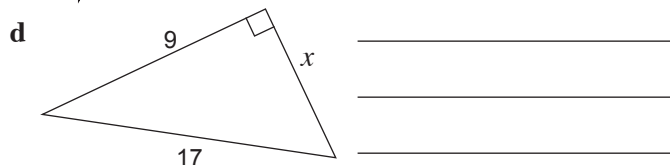
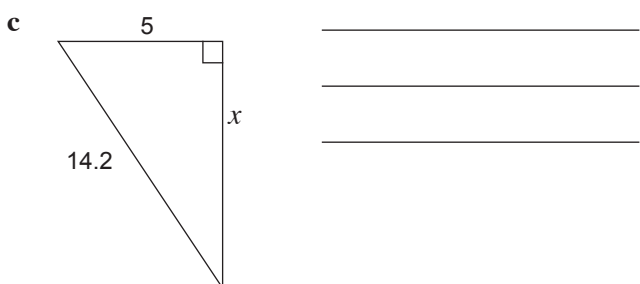
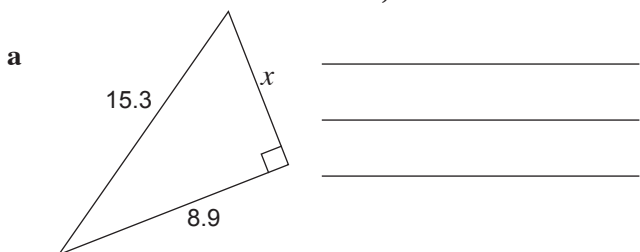
Pythagoras' theorem

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.)



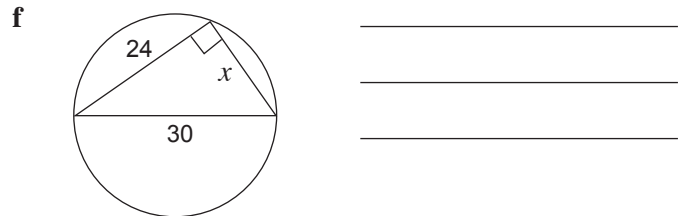
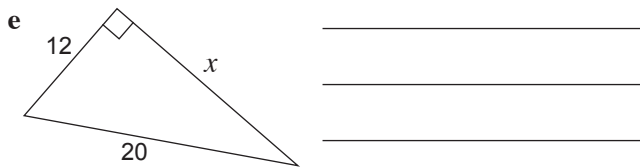
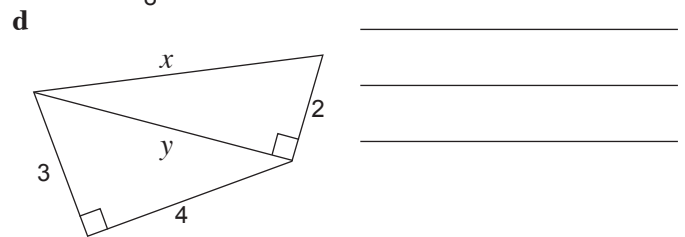
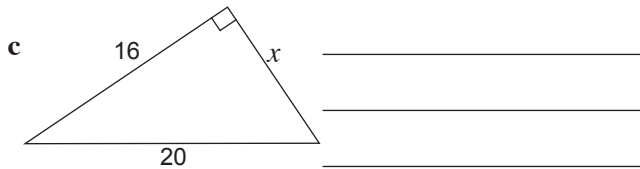
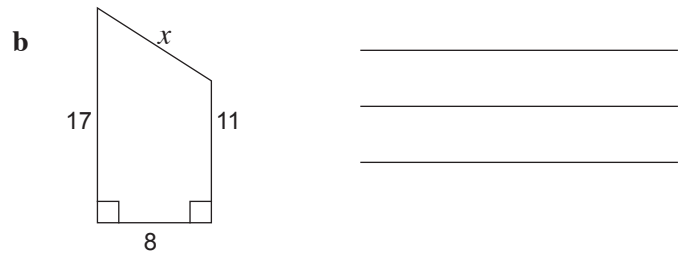
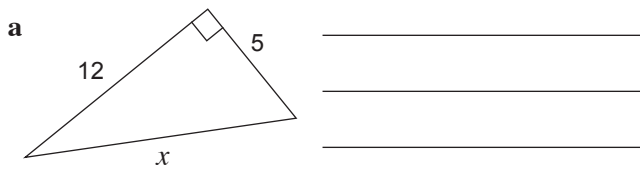
QUESTION 2 Find the length of the unknown side correct to one decimal place. (All measurements are in centimetres.)



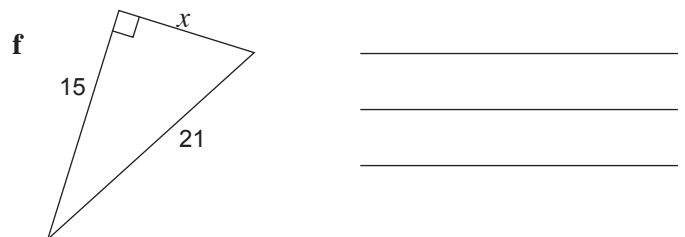
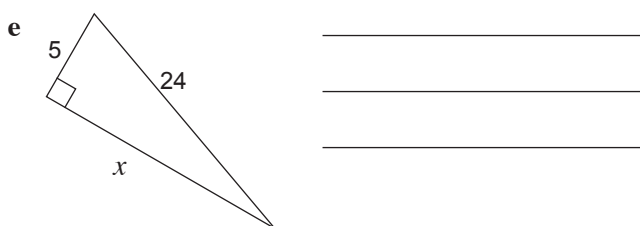
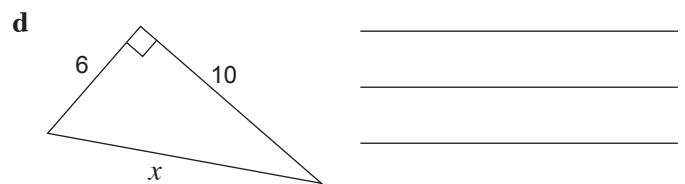
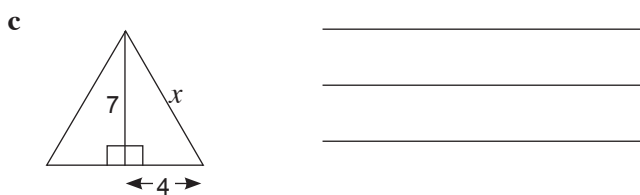
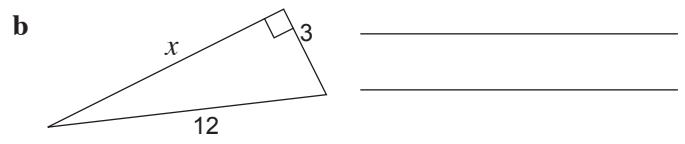
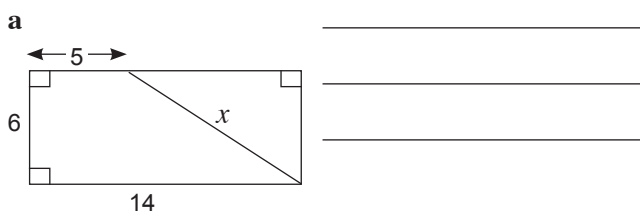
Pythagoras' theorem

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.

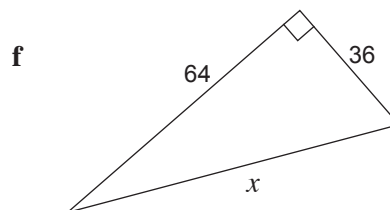
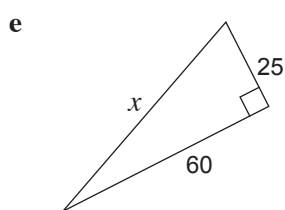
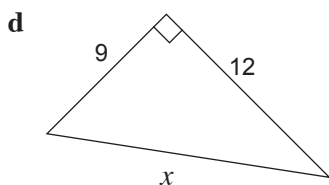
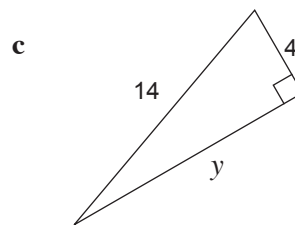
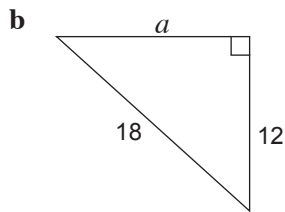
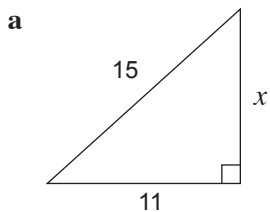
- 3 What is the altitude of an equilateral triangle whose sides are each 16 cm long?
Give your answer correct to two decimal places. _____
- 4 A 15 metre ladder rests against a wall and its foot is 4 metres away from the base of the wall. How high does it reach up the wall? Give your answer correct to 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.

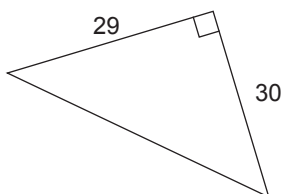
- 6 The hypotenuse of a right angled triangle is 30 cm. If one of the shorter sides is 18 cm, find the length of the other side.

- 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

	Marks
1 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
2 The longest side of a right angled triangle is called the (A) shortest side (B) middle side (C) hypotenuse (D) none of these	1
3 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
4 Pythagoras' theorem can be applied to (A) acute angled triangles (B) obtuse angled triangles (C) right angled triangles (D) any triangle	1
5 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
6 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
7 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
8 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
9 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
10 In a triangle ABC right angled at C, the hypotenuse is named as (A) a (B) b (C) c (D) none of these	1
11 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
12 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

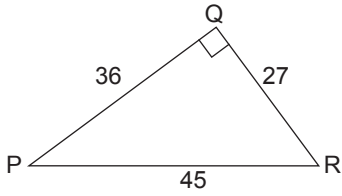
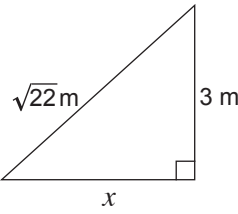
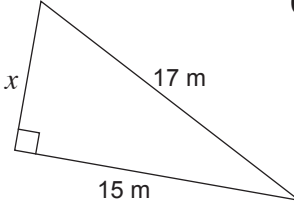
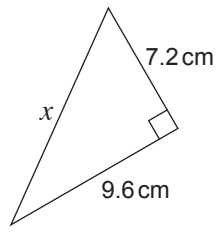
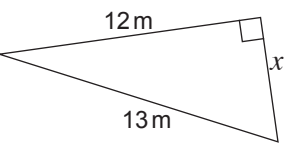
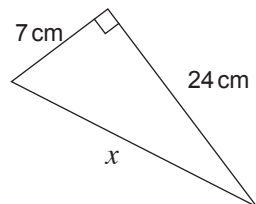
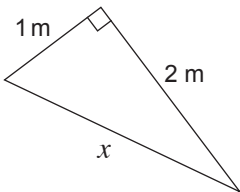
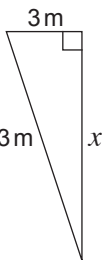
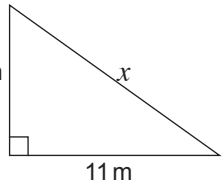
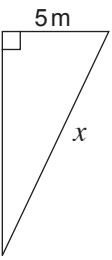
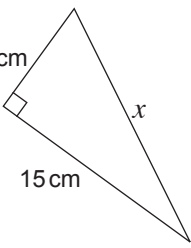
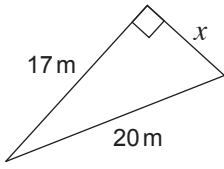
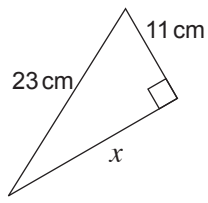
Topic Test

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

Total marks achieved for PART B

15
