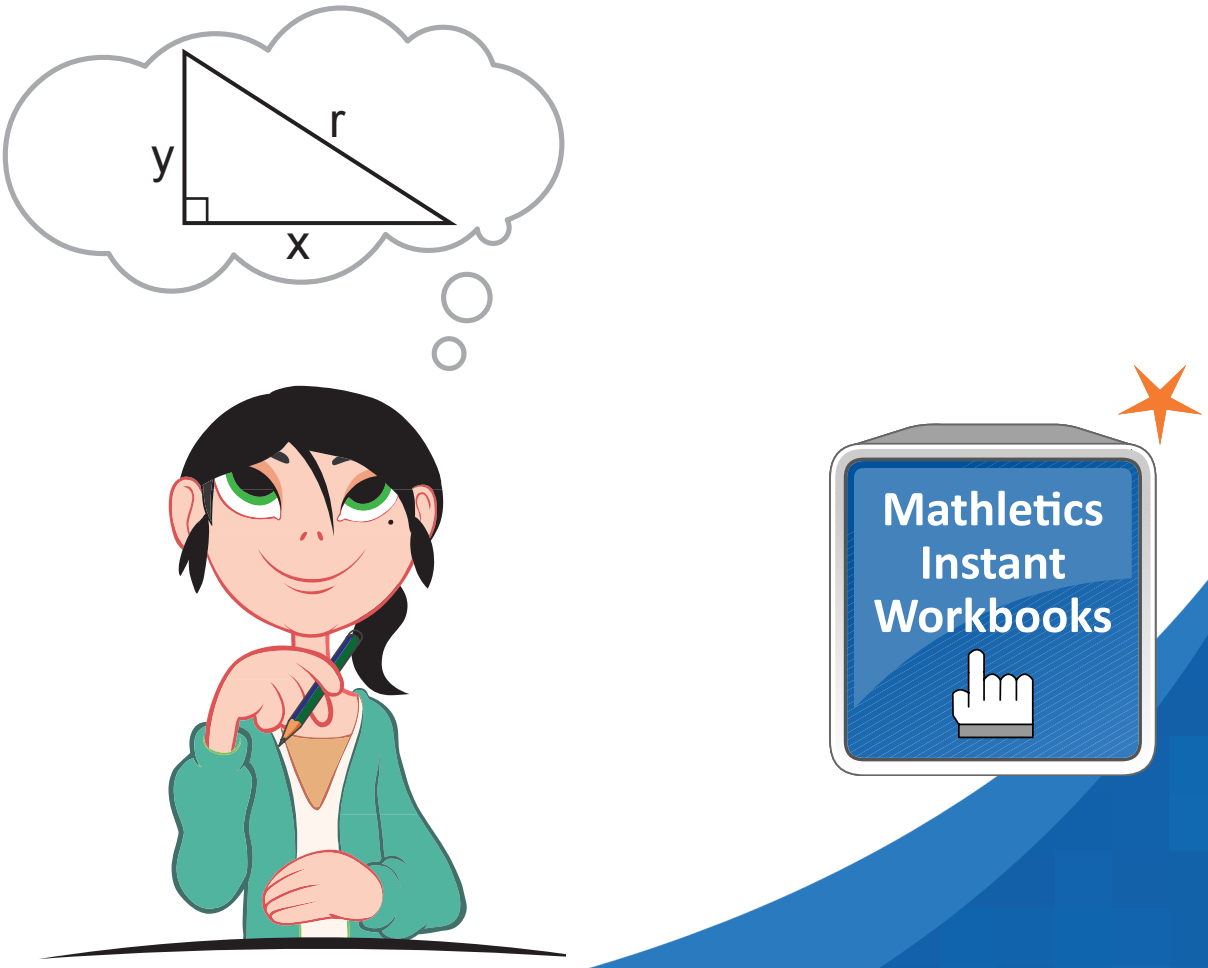
MATHLETICS

Pythagoras' Theorem

Teacher Book - Series 1-2



Pythagoras' theorem

Topic Test — PART A

Instructions This part consists of 15 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 = 15**

Marks

1 $\sqrt{5}$ is closest to

Ⓐ 2 Ⓑ 2.2 Ⓒ 2.23 Ⓓ 2.24 — 1

2 Which of the following is not a Pythagorean triad?

Ⓐ {6, 8, 10} Ⓑ {5, 12, 13} Ⓒ {9, 40, 41} Ⓓ {7, 25, 26} — 1

3 The Pythagorean result for a triangle ABC with hypotenuse BC is

Ⓐ $a^2 = b^2 + c^2$ Ⓑ $b^2 = a^2 + c^2$ Ⓒ $a^2 = c^2 - b^2$ Ⓓ $c^2 = b^2 + a^2$ — 1

4 If two sides of a right-angled triangle are 7 cm and 24 cm, then the hypotenuse is

Ⓐ 23 cm Ⓑ 24 cm Ⓒ 25 cm Ⓓ 31 cm — 1

5 In a right-angled triangle, the side opposite the right angle is called the

Ⓐ shortest side Ⓑ middle side Ⓒ hypotenuse Ⓓ none of these — 1

6 Which one of the following triads determines a right-angled triangle?

Ⓐ {8, 9, 12} Ⓑ {11, 10, 15} Ⓒ {9, 11, 20} Ⓓ {16, 30, 34} — 1

7 Pythagoras' theorem can be applied to

Ⓐ acute-angled triangles Ⓑ obtuse-angled triangles
Ⓒ right-angled triangles Ⓓ any triangle — 1

8 Find the area of a rectangle which has a diagonal 10 cm long and one side 6 cm long.

Ⓐ 40 cm^2 Ⓑ 48 cm^2 Ⓒ 60 cm^2 Ⓓ 80 cm^2 — 1

9 Given that $c^2 = a^2 + b^2$ and $a = 10$ and $b = 24$, what is the value of c?

Ⓐ 26 Ⓑ 28 Ⓒ 576 Ⓓ 676 — 1

10 The hypotenuse of a right-angled triangle is 17 cm. If one side is 8 cm, the third side is

Ⓐ 9 cm Ⓑ 11 cm Ⓒ 13 cm Ⓓ 15 cm — 1

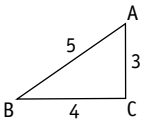
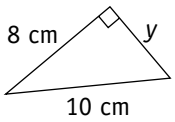
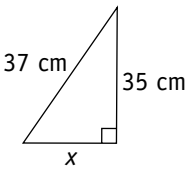
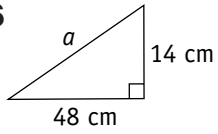
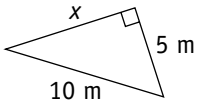
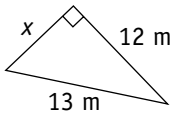
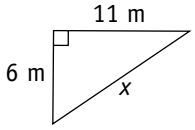
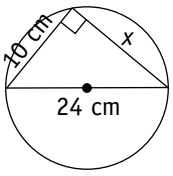
		Marks
11	Which of the following is a Pythagorean triad? Ⓐ {5, 10, 17} Ⓑ {5, 12, 13} Ⓒ {5, 12, 14} Ⓓ {5, 20, 25}	1
12	A triangle is said to satisfy the rule $c^2 = a^2 + b^2$ for which special triangle? Ⓐ acute-angled Ⓑ right-angled Ⓒ obtuse-angled Ⓓ any	1
13	The longest side of a right-angled triangle is called the Ⓐ shortest side Ⓑ middle side Ⓒ hypotensue Ⓓ none of these	1
14	If $n^2 = 625$ then n equals Ⓐ 15 Ⓑ 25 Ⓒ 35 Ⓓ 45	1
15	The two shorter sides of a right-angled triangle have lengths 12 cm and 5 cm. What is the square of the length of the hypotenuse? Ⓐ 13 Ⓑ 119 Ⓒ 169 Ⓓ 289	1
	Total marks achieved for PART A	/15

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
1 If $a^2 = 4761$, find the value of a	_____	1
2 Is {8, 15, 17} a Pythagorean triad?	_____	1
3 Is ΔABC a right-angled triangle? 	_____	1
Find the value of the unknown side in each triangle below.		
4 	_____	1
5 	_____	1
6 	_____	1
Find the length of the unknown side in each triangle correct to 2 decimal places.		
7 	_____	1
8 	_____	1
9 	_____	1
10 If the two shorter sides of a right-angled triangle are 9 cm and 11 cm, find the hypotenuse.	_____	1
11 Find the length of the diagonal of a square of side 8 cm.	_____	1
12 Find the height of an equilateral triangle whose sides are 16 cm.	_____	1
13 Find the length of the diagonal of a rectangle of length 20 cm and width 8 cm.	_____	1
14 Find the value of x. 	_____	1
15 The hypotenuse of a right-angled triangle is 42 cm. If one of the short sides is 20 cm, find the length of the other side.	_____	1

Total marks achieved for PART B 15

Pythagoras' theorem

Topic Test — PART C

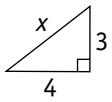
Instructions This part consists of 4 questions
Each question is worth 5 marks
Show all necessary

Time allowed: 20 minutes **Total marks = 20**

Questions

Marks

1 **a** Find c given that $c^2 = 12^2 + 5^2$ _____ **b** Find a given that $100 = a^2 + 64$ _____

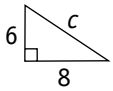
c Find $\sqrt{225}$ _____ **d** Find x 

_____

e The longest side in a right-angled triangle is called the _____.

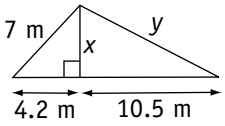
5

2 **a** A triangle is said to satisfy the rule $c^2 = a^2 + b^2$ for which special triangle?
_____

b Find c 

_____

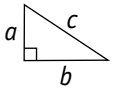
c The longest side of a right-angled triangle is 17 cm. If one side is 15 cm, find the length of the third side. _____

d Find x in the given triangle. 

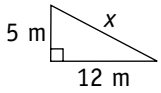
_____

e Find y in the given triangle. _____

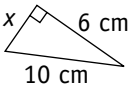
5

3 **a** State Pythagoras' theorem in terms of a, b and c. 

_____

b 

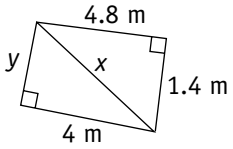
x = _____

c 

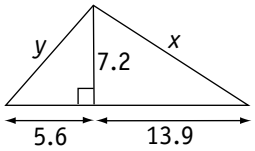
x = _____

d Find x in the given diagram. _____

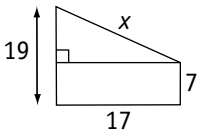
e Find y in the given diagram. _____



5

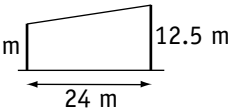
4 **a** 

x = _____
y = _____

b 

x = _____

c A ladder 3.8 m long is leaning against a wall. The foot of the ladder is 1.4 m away from the bottom of the wall. How far up the wall does the ladder reach?
_____

d Two flag posts are 9 m and 12.5 m long and 24 m apart.
Find the length of the string needed to join the tops of the two posts. 

_____

5

Total marks achieved for PART C 20

Answers – Pythagoras' theorem

Page 1 **1 a** *c* **b** *f* **c** *h* **d** JL **e** MN **f** PR **2 a** AB **b** EF **c** JL **d** PQ **e** AC **f** VZ **3 a** *c* **b** *a* **c** *b* **d** *c* **e** a^2 **f** b^2 **g** c^2 **h** hypotenuse

Page 2 **1** 16, 12, 20, 256, 144, 400, 400 **2** 9, 12, 15, 81, 144, 225, 225 **3** 24, 10, 26, 576, 100, 676, 676 **4** 30, 16, 34, 900, 256, 1156, 1156 **5** 4, 3, 5, 16, 9, 25, 25 **6** 15, 20, 25, 225, 400, 625, 625 **7** 5, 12, 13, 25, 144, 169, 169 **8** 8, 6, 10, 64, 36, 100, 100 **9** 8, 15, 17, 64, 225, 289, 289 **10** 40, 9, 41, 1600, 81, 1681, 1681 **11** 24, 18, 30, 576, 324, 900, 900 **12** 80, 18, 82, 6400, 324, 6724, 6724

Page 3 **1** c **2** c **3** b **4** c **5** c **6** c **7** c **8** b **9** c **10** c **11** c **12** c **13** c **14** a **15** c **16** b

Page 4 **1 a** 25 **b** 225 **c** 784 **d** 961 **e** 8464 **f** 81 **g** 3136 **h** 49 **i** 3721 **j** 1024 **k** 7225 **l** 6084 **2 a** 2 **b** 1 **c** 3 **d** 4 **e** 7 **f** 8 **g** 5 **h** 9 **i** 10 **j** 12 **k** 6 **l** 11 **3 a** 28 **b** 17 **c** 37 **d** 13 **e** 14 **f** 49 **g** 21 **h** 34 **i** 18 **j** 16 **k** 15 **l** 63 **4 a** 1.69 **b** 31.36 **c** 62.41 **d** 27.04 **e** 44.89 **f** 69.7225 **g** 68.89 **h** 69.2224 **i** 126.5625 **j** 94.09 **k** 29.2681 **l** 492.84 **5 a** 31.4721 **b** 10.24 **c** 39.8161 **d** 60.84 **e** 28.09 **f** 182.25 **g** 34.81 **h** 46.24 **i** 231.04 **j** 44.89 **k** 84.64 **l** 80.1025 **6 a** 2.3 **b** 2.6 **c** 7.3 **d** 2.8 **e** 1.8 **f** 9.7 **g** 2.8 **h** 2.6 **i** 7.9 **j** 2.9 **k** 2.9 **l** 8.6

Page 5 All answers are in cm. **1 a** 5 **b** 13 **c** 10 **d** 26 **e** 17 **f** 25 **2 a** 9.8 **b** 7.1 **c** 14.0 **d** 8.7 **e** 5.9 **f** 18.8 **g** 10.8 **h** 8.5 **i** 7.2

Page 6 All answers are in cm. **1 a** 6 **b** 8 **c** 24 **d** 4 **e** 9 **f** 15 **2 a** 9.90 **b** 12.39 **c** 13.89 **d** 17.35 **e** 8.39 **f** 10.40 **g** 18.90 **h** 20.03 **i** 6.62

Page 7 All answers are in cm. **1 a** 5 **b** 5 **c** 8 **d** 7 **e** 9 **f** 10 **2 a** 15.0 **b** $x = 10.0$, $y = 10.4$ **c** 14.5 **d** 9.9 **e** 9.0 **f** 9.0 **g** 14.1 **h** 7.8 **i** 14.6

Page 8 **1** e, f, g, i , j, k, l

Page 9 **1** 7.6 cm **2** 13.7 cm **3** 16.0 cm **4** 16.6 cm **5** 23.3 cm **6** 12.1 cm **7** 29.4 cm **8** 9.9 cm **9** 10.39 cm **10** 47.51 cm **11** 42.06 cm **12** 5.20 m **13** 6.98 **14** 6.54 **15** 11.18

Pages 10 & 11 **1** D **2** D **3** A **4** C **5** C **6** D **7** C **8** B **9** A **10** D **11** B **12** B **13** C **14** B **15** C

Page 12 **1** 69 **2** yes **3** yes **4** 6 cm **5** 12 cm **6** 50 cm **7** 8.66 m **8** 5.00 m **9** 12.53 m **10** 14.21 cm **11** 11.31 cm **12** 13.86 cm **13** 21.54 cm **14** 21.82 cm **15** 36.93 cm

Page 13 **1 a** 13 **b** 6 **c** 15 **d** 5 **e** hypotenuse **2 a** right-angled triangle **b** 10 **c** 8 cm **d** 5.6 m **e** 11.9 m **3 a** $c^2 = a^2 + b^2$ **b** 13 m **c** 8 cm **d** 5 m **e** 3 m **4 a i** 15.65 **ii** 9.12 **b** 20.81 **c** 3.53 m **d** 24.25 m