Pythagoras' theorem

TOPIC TEST

PART A

Instructions • This part consists of 15 multiple choice questions
• Fill in only ONE CIRCLE for each question
• Each question is worth 1 mark
• Calculators may be used

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 cm² Ⓑ 48 cm² Ⓒ 60 cm² Ⓓ 80 cm²

| 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

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

Time allowed: 15 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 $\triangle ABC$ a right-angled triangle?		1

Find the value of the unknown side in each triangle below.

4 8 cm, y, 10 cm

5 37 cm, 35 cm, x

6 a, 14 cm, 48 cm

		Marks
		1
		1
		1
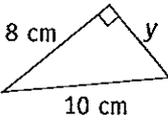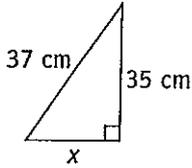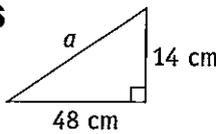
Find the length of the unknown side in each triangle correct to 2 decimal places.

7 x, 5 m, 10 m

8 x, 12 m, 13 m

9 11 m, 6 m, x
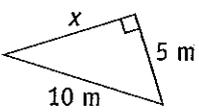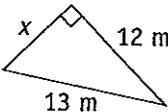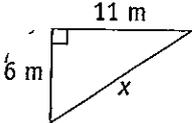
		Marks
		1
		1
		1

10 If the two shorter sides of a right-angled triangle are 9 cm and 11 cm, find the hypotenuse.

11 Find the length of the diagonal of a square of side 8 cm.

12 Find the height of an equilateral triangle whose sides are 16 cm.

13 Find the length of the diagonal of a rectangle of length 20 cm and width 8 cm.

14 Find the value of x.

10 cm, x, 24 cm
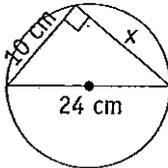
15 The hypotenuse of a right-angled triangle is 42 cm. If one of the short sides is 20 cm, find the length of the other side.

	Marks
	1
	1
	1
	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 working

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

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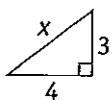
e The longest side in a right-angled triangle is called a _____.

5

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

_____

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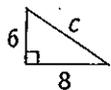
c The longest side of a right-angled triangle is 17 cm. If one side is 15 cm, find the length of the third side. _____

d Find x in the given triangle. 7 m _____
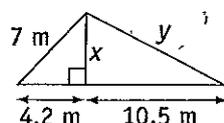
e Find y in the given triangle. 4.2 m 10.5 m _____
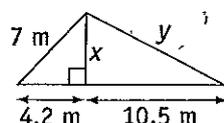
5

3 a State Pythagoras' theorem in terms of a, b and c. _____
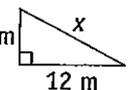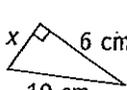
b 5 m 12 m $x =$ _____ c x 6 cm 10 cm $x =$ _____

d Find x in the given diagram. _____ 4.8 m

e Find y in the given diagram. _____ 1.4 m 4 m

5

4 a 7.2 5.6 13.9 $x =$ _____ $y =$ _____

b 19 7 17 $x =$ _____

5
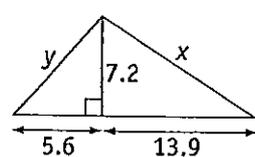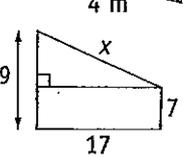
c A ladder 3.8 m long is leaning against a wall. The foot of the ladder is 1.4 m away from the bottom of the wall. What is the height of the wall?

_____

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. 9 m 12.5 m 24 m
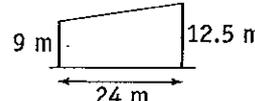
5

Total marks achieved for PART C /20

Answers

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

PAGE 15 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 16 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 17 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 18 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 19 1 e, f, g, i, j, k, l

PAGE 20 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 21 & 22 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 23 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 24 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 $x = 15.65, y = 9.12$ b 20.81 c 3.53 m d 24.25 m

PAGE 25 1 a $\frac{1}{10}$ b $\frac{1}{2}$ c $\frac{9}{10}$ d $\frac{3}{20}$ e $\frac{1}{5}$ f $\frac{3}{5}$ g $\frac{3}{4}$ h $\frac{57}{100}$ i $\frac{19}{25}$ j $\frac{19}{100}$ k $\frac{11}{20}$ l $\frac{49}{50}$ 2 a $\frac{3}{200}$ b $\frac{2}{125}$ c $\frac{57}{500}$ d $\frac{47}{500}$ e $\frac{1}{40}$ f $\frac{7}{125}$ g $\frac{7}{800}$ h $\frac{1}{1000}$ i $\frac{1}{2000}$ j $\frac{1}{600}$ k $\frac{9}{1000}$ l $\frac{121}{400}$ 3 a $\frac{13}{50}$ b $\frac{1}{3}$ c $\frac{101}{200}$ d $\frac{9}{400}$ e $\frac{63}{400}$ f $\frac{43}{50}$ g $\frac{71}{200}$ h $\frac{9}{25}$ i $\frac{2}{3}$ 4 a 3% b 7% c 11% d 23% e 37% f 39% g $24\frac{2}{7}$% h $23\frac{1}{4}$% i $7\frac{1}{2}$% j $23\frac{1}{3}$% k $6\frac{4}{11}$% l 8% 5 a 60% b $17\frac{1}{7}$% c 20% d $77\frac{7}{9}$% e $66\frac{2}{3}$% f $12\frac{1}{2}$%

PAGE 26 1 a 0.3 b 0.2 c 1.1 d 0.7 e 0.8 f 0.6 g 0.65 h 0.45 i 1.55 j 0.95 k 1.05 l 0.25 2 a 0.04 b 0.62 c 0.56 d 0.657 e 0.687 f 0.374 g 0.689 h 0.536 i 0.596 j 0.917 k 0.439 l 0.689 3 a 0.015 b 0.032 c 0.185 d 0.125 e 0.0625 f 0.2525 4 a 40% b 90% c 60% d 15% e 20% f 45% g 13.8% h 23.4% i 48.2% j 35.6% k 50.4% l 57.9% 5 a 0.7% b 0.9% c 0.1% d 1.3% e 1.5% f 0.6% g 0.5% h 0.3% i 0.2% j 1.2% k 2.3% l 3.4% 6 a 135% b 211% c 912.3% d 246% e 687% f 611.8% g 579% h 357% i 842%

PAGE 27 1 a 20 b 560 c 960 d 280 e 150 f 270 g 320 h 540 i 300 j 1320 k 260 l 1300 2 a 55 b 157.5 c 1008 d 1625 e 600 f 112.5 g 525 h 33.75 i 776.25 j 255 k 798 l 453.75 3 a 3.9 b 117.6 c 803.84 d 58.8 e 471.04 f 482.4 g 128.8 h 408.36 i 813.4 j 327.08 k 656.56 l 924.8 4 a 3.25 b 89.28 c 10.92 d 27.47 e 14.56 f 101.91 g 28.42 h 25.46 i 25.35 j 139.4 k 85.988 l 104.4 5 a 15 b $33\frac{1}{3}$ c $411\frac{3}{4}$ d 643.5 e 377.5 f $37\frac{1}{2}$ g 101 h 10.5 i 724 6 a 28 b 8.4 c 108 d 18.75 e 355 f 110.622 g 30.625 h 67 i 120

PAGE 28 1 a $99 b 115.2 h c $675 d 1040 ha e $1020 f 100.8 min g 600 g h 1190 L i 1240 kg j 114 t k $966 l 1435.5 cm 2 a $228 b $76.80 c 14.4 m d 116 L e $372 f $3116.60 g $70.50 h $228.75 i $646.48 j $55 k $168 l $396 3 a $330 b 1800 L c $440 d 180 t e 21 m f 510 g $1118 h $1040 i $1433.60 j $1520 k $218.50 l $3125 4 a $28 800 b $300 c $5760 d $3270

PAGE 29 1 a 10% b 4% c 1.25% d 25% e 15.56% f 20% g 42.86% h 91.1% i 25% j 5% k 37.5% l 12% 2 a 3.3% b 1.33% c 8.33% d 41.67% e 8.33% f 12.5% g 20% h 3.125% i 20% j 31.25% k 8.33% l 33.33% 3 a 6.25% b 6.67% c 3.89% d 285.71% e 9.375% f 3.2% g 14.29% h 5% i 1.11% j 0.5% k 33.33% l 20% 4 a $23\frac{1}{3}$% b 17.86% c 5.56% d 5%

PAGE 30 1 a 340 b 920 c $2400 d 2500 e $66\frac{2}{3}$ 2 a 135 b 720 c 80 d 223.53 e 460 3 a 1000 b 980 c 600 d $533\frac{2}{3}$ e 50 f 7680 g 62.22 h 5760 i 500 j $906\frac{2}{3}$ k 3000 l 187.5 4 a $275 b $32.29 c 40.5 d $20 750

PAGE 31 1 28 2 160 g 3 1900 4 $84 5 $336 6 $794.88 7 $63 8 $6\frac{2}{3}$% 9 $147 10 60% 11 $43 000