Name: _____

TOPIC TEST 1

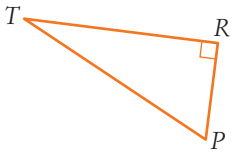
Pythagoras' theorem

- Time allowed: 45 minutes
- Part A: 20 multiple-choice questions (40 marks)
- Part B: 16 free-response questions (60 marks)

Part A

20 multiple-choice questions
2 marks each: 40 marks
Circle the correct answer.

1 Which side of this triangle is the hypotenuse?

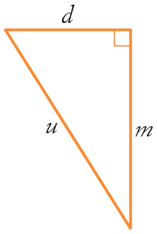


A TR **B** RP **C** TP **D** PR

2 Which one of these numbers is a surd?

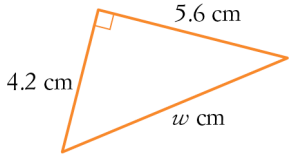
A $\sqrt{36}$ **B** $\sqrt{100}$ **C** $\sqrt{40}$ **D** $\sqrt{64}$

3 Which of the following is the correct Pythagoras' theorem for this triangle?



A $d^2 = m^2 - u^2$ **B** $d^2 = m^2 + u^2$
C $m^2 = d^2 + u^2$ **D** $u^2 = m^2 + d^2$

4 What is the value of w in this triangle?

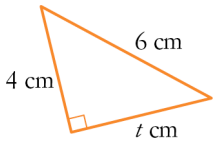


A 3.70 **B** 9.8 **C** 7 **D** 1.4

5 The value of $\sqrt{1.7^2 - 1.5^2}$ is closest to:

A 0.64 **B** 0.8 **C** 0.20 **D** 0.45

6 What is the value of t in this triangle?



A 1.41 **B** 7.21 **C** 4.47 **D** 20

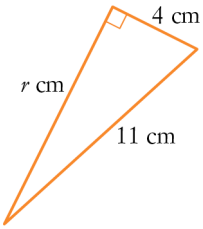
7 Which of the following completes this Pythagorean triad: 9, 12, ___?

A 13 **B** 14 **C** 15 **D** 16

8 If $x^2 = 37^2 - 35^2$, what is the value of x?

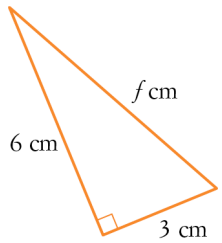
A 4 **B** 12 **C** $\sqrt{2}$ **D** 6

9 What is the value of r in this triangle?



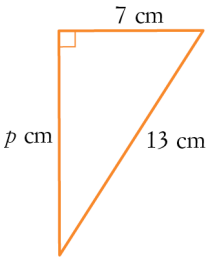
A 11.70 **B** 10.25 **C** 8 **D** 2.65

10 What is the value of f in this triangle?



A 4.24 **B** 8.19 **C** 6.71 **D** 5.20

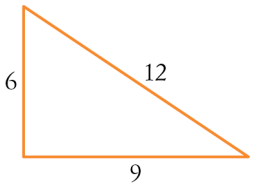
11 What is the value of p as a surd?



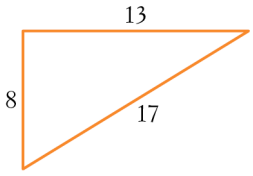
A $\sqrt{6}$ **B** $\sqrt{70}$ **C** $\sqrt{20}$ **D** $\sqrt{120}$

12 Which of these triangles is right-angled?

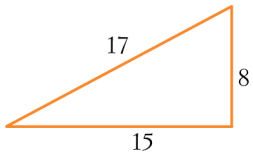
A



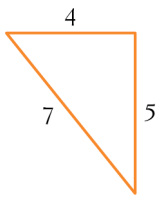
B



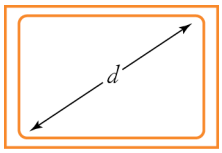
C



D



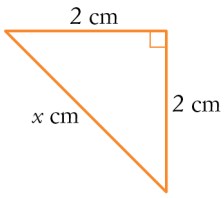
13 A television screen has a width of 55 cm and a height of 40 cm. Which of the following is the length of its diagonal, correct to the nearest centimetre?



A 68 cm **B** 62 cm

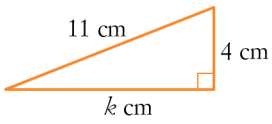
C 69 cm **D** 63 cm

14 What is the value of x in this triangle?



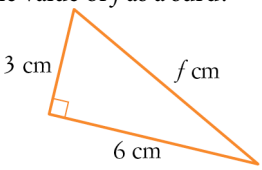
A $\sqrt{8}$ **B** $\sqrt{2}$ **C** $\sqrt{4}$ **D** $\sqrt{6}$

15 What is the value of k in this triangle?



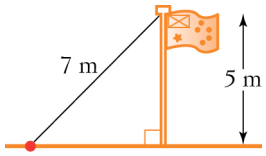
A 2.65 **B** 8 **C** 10.25 **D** 11.70

16 What is the value of f as a surd?



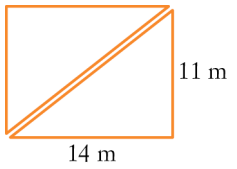
A $\sqrt{18}$ **B** $\sqrt{27}$ **C** $\sqrt{45}$ **D** $\sqrt{67}$

17 A flagpole of height 5 metres is tied to the ground by a 7 metre cable. How far from the base of the flagpole is the cable tied?



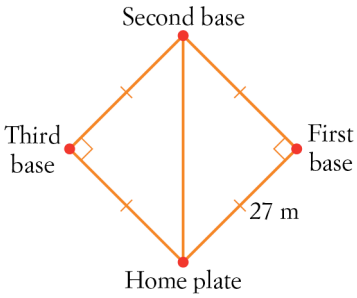
A 8.60 m **B** 4 m **C** 1.41 m **D** 4.90 m

18 This diagram shows a park with a diagonal path through it. Find the length of the path.



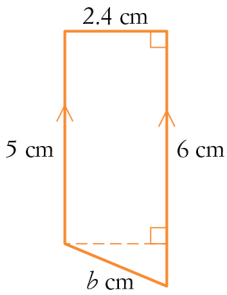
A 77 m **B** 17.80 m **C** 12.41 m **D** 25 m

19 A baseball field is shaped like a square with a side length of 27 metres. What is the distance between the home plate and second base?



A 7.35 m **B** 52 m **C** 40.50 m **D** 38.18 m

20 What is the value of b in this diagram?



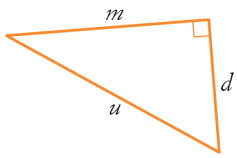
A 8.17 **B** 3.32 **C** 2.60 **D** 2.18

Part B

16 free-response questions
60 marks
Show your working where appropriate.

21 (4 marks) Write Pythagoras' theorem for each of the following triangles.

a



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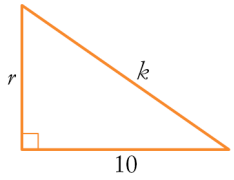
b



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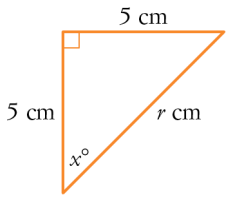
22 (4 marks) Find the values of r and x in this triangle.



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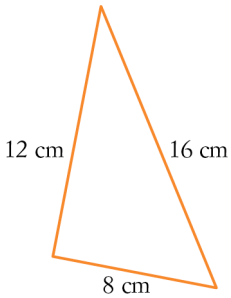
23 (6 marks) Test whether each of the following triangles is right-angled.

a



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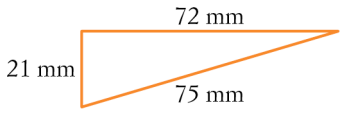
b



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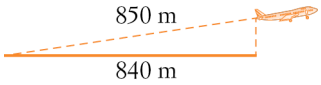
24 (2 marks) After taking off, a plane flies 850 metres but covers a ground distance of 840 metres. How high is the plane above the ground?



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25 (6 marks)

a Use a ruler to draw a right-angled triangle with the two shorter sides measuring 2.5 cm and 6 cm.

b Measure the length of the hypotenuse of the triangle you drew in part **a**.

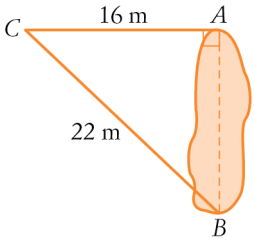
_____

c Use Pythagoras' theorem to calculate the length of the hypotenuse (show your working).

_____

_____

26 (2 marks) Ray found the distance across a pond by taking the measurements shown. Find the distance AB correct to one decimal place.



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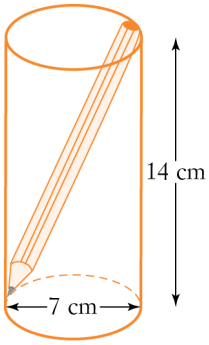
27 (2 marks) How long is the pencil inside this cylinder? Answer correct to one decimal place.



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28 (3 marks) From home, Dakota walked 1.2 km due south before turning and walking 3 km due west. How far is she from home when the distance is measured directly? Answer correct to two decimal places.

_____

_____

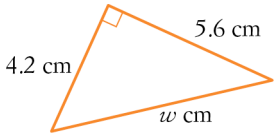
29 (4 marks) Use appropriate words to complete each of these sentences.

a Pythagoras' theorem is only true for _____ triangles.

b Pythagoras' theorem states that the square of the _____ is equal to the _____ of the squares of the other _____ sides.

30 (4 marks) Find the value of each pronumeral in these diagrams.

a



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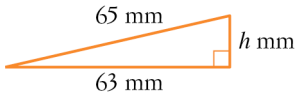
b



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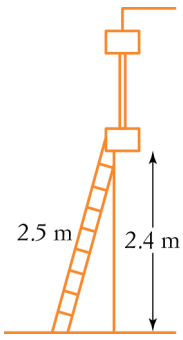
31 (2 marks) A 2.5 metre ladder reaches up a wall to a window 2.4 metres high. Calculate how far the base of the ladder is from the bottom of the wall.



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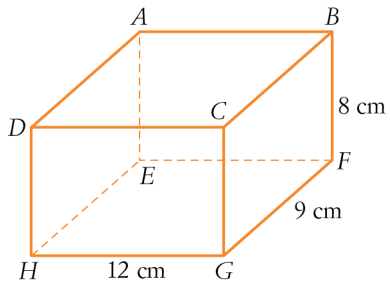
32 (4 marks)

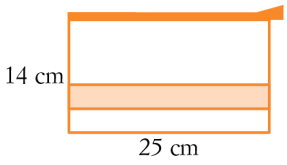


For this rectangular prism, calculate the length of the diagonal:

a *HF*

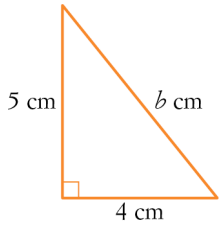
b *HB*

33 (2 marks) Test whether a 30 cm ruler can fit inside a rectangular pencil case of dimensions 25 cm by 14 cm.

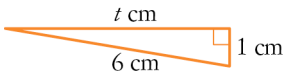


34 (4 marks) For the triangles below, find the value of each pronumeral as a surd.

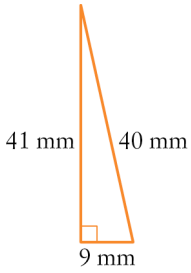
a



b

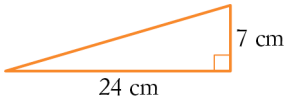


35 (2 marks) There is something wrong with this diagram. This could not possibly be a right-angled triangle. Explain why.

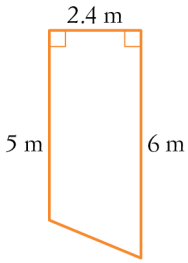


36 (9 marks) Calculate the perimeter of each of the following figures.

a

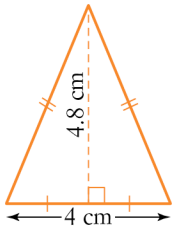


b



Question 36 continues next page

c



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This is the end of the test.
Use the rest of the page and the back for extra working space.

Answers

1 C	**2** C	**3** D	**4** C	**5** B
6 C	**7** C	**8** B	**9** B	**10** C
11 D	**12** C	**13** A	**14** A	**15** C
16 C	**17** D	**18** B	**19** D	**20** C

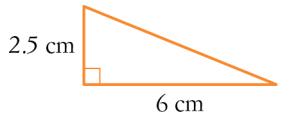
21 **a** $u^2 = d^2 + m^2$ **b** $k^2 = r^2 + 10^2$

22 $r = 7.07$, $x = 45$

23 **a** Not right-angled **b** Right-angled

24 130 m

25 **a**



b and c 6.5 cm

26 $AB = 15.1$ m

27 15.7 cm

28 3.23 km

29 **a** right-angled **b** hypotenuse, sum, two

30 **a** $w = 7$ **b** $h = 16$

31 0.7 m

32 **a** 15 cm **b** 17 cm

33 No, it won't fit. The diagonal of the pencil case is the hypotenuse of a right-angled triangle and measures 28.65 cm (< 30 cm)

34 **a** $\sqrt{41}$ **b** $\sqrt{35}$

35 The hypotenuse is not the longest side in the triangle shown; or $40^2 \neq 9^2 + 41^2$

36 **a** 56 cm **b** 16 m **c** 14.4 cm