

WA8MMGTW3

Two-dimensional space and structures

Core + Challenge

Pythagoras' Theorem in Problems

I can use Pythagoras' theorem to solve practical problems, find distances on a grid and test for right angles.

Name: _____ Date: _____ Score: _____ / 59

Key idea

Draw a diagram and mark the hypotenuse c . Finding $c \rightarrow$ **add** the squares; a shorter side $\rightarrow$ **subtract**.

Distance between two points: use the horizontal and vertical gaps. (1, 2) to (7, 10): gaps 6 and 8 $\rightarrow \sqrt{100} = 10$.

Converse: if (longest side)² = sum of the other two squares, it **is** right-angled. 7, 24, 25: $49 + 576 = 625 = 25^2$.

Multi-step: find a shared side in one triangle, then use it in the next. Round only the final answer.

A

Fluency *practise the skill*

/ 16 marks

Q1–8: distances between points. Q9–12, 16: do the three lengths make a right-angled triangle? 1 mark each.

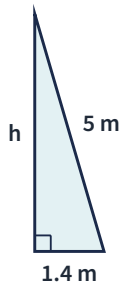
- | | |
|---|--|
| 1. Distance (1, 1) to (−3, 1) _____ | 9. Right-angled? 6, 8, 10 _____ |
| 2. Distance (−3, 1) to (−3, −5) _____ | 10. Right-angled? 5, 6, 8 _____ |
| 3. Horizontal gap: (1, 1) to (4, 5) _____ | 11. Right-angled? 9, 40, 41 _____ |
| 4. Vertical gap: (1, 1) to (4, 5) _____ | 12. Right-angled? 4, 5, 6 _____ |
| 5. Distance (1, 1) to (4, 5) _____ | 13. Diagonal of a 5×12 rectangle _____ |
| 6. (1, 1) to (−3, −5), 1 d.p. _____ | 14. Diagonal of a 1×1 square (2 d.p.) _____ |
| 7. (−3, −5) to (5, −1), 1 d.p. _____ | 15. Diagonal of a 20×21 rectangle _____ |
| 8. (4, 5) to (5, −1), 1 d.p. _____ | 16. Right-angled? 1.5, 2, 2.5 _____ |

B

Core *apply the skill to problems*

/ 23 marks

- 1 A 5 m ladder leans against a wall. Its foot is 1.4 m from the wall. How high up the wall does it reach? [2 marks]



Answer: _____

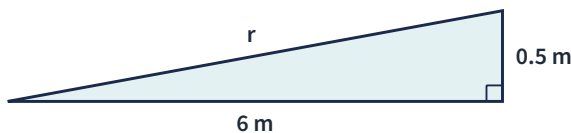
- 2 TV screens are sold by the length of their diagonal. A screen is 121 cm wide and 68 cm tall. Find its diagonal to the nearest centimetre, then convert it to the nearest inch (1 inch = 2.54 cm). [3 marks]

.....

.....

Answer: _____

- 3 A wheelchair ramp rises 0.5 m over a horizontal distance of 6 m. Find the length of the ramp's surface, r , correct to 2 decimal places. (Not to scale.) [2 marks]



Answer: _____

- 4 On a map grid, 1 unit = 100 m. A Transperth bus stop is at (2, 1) and a school is at (8, 9). Find the straight-line distance between them in metres. [2 marks]

.....

Answer: _____

Pythagoras' Theorem in Problems · WA8MMGTW3

- 5 A soccer pitch is 100 m by 64 m. How much shorter is it to walk diagonally across the pitch than along two sides? Answer to the nearest metre. [3 marks]

.....

.....

Answer:

- 6 A builder checks a wall frame: the sides are 60 cm and 80 cm and the diagonal is 99 cm. Is the corner a right angle? Explain. [2 marks]

.....

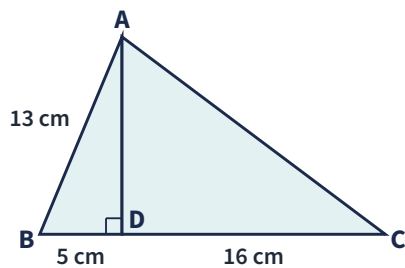
Answer:

- 7 Which of these triangles are right-angled? (a) 8, 15, 17 (b) 10, 11, 15 (c) 2.5, 6, 6.5 [2 marks]

.....

Answer:

- 8 AD is perpendicular to BC. Find AD, then AC. [3 marks]



Answer:

- 9 A kite is flying on 50 m of taut string. It is directly above a point on the ground 30 m from the person holding the string. How high is the kite? (Ignore the person's height.) [2 marks]

.....

Answer:

Pythagoras' Theorem in Problems · WA8MMGTW3

- 10 A wardrobe lying on its back is 2.4 m tall and 0.6 m deep (side view shown). The ceiling is 2.45 m high. Can it be tipped up to stand without hitting the ceiling? Explain. [2 marks]



Answer: _____

C Reasoning *explain, justify and check*

/ 9 marks

- 1 Maya says, '5, 12, 13 is right-angled, so 10, 24, 26 must be right-angled too.' Is she correct? Explain. [2 marks]
-
-
- 2 Tom says a triangle with sides 7, 8 and 11 is right-angled because $7 + 8 > 11$. Explain his error and test the triangle properly. [2 marks]
-
-
- 3 Explain why the diagonal of a rectangle is always longer than each side but shorter than the two sides added together. [2 marks]
-
-
- 4 In Core Q1, the foot of the ladder slides further from the wall. What happens to the height it reaches? Explain using $h^2 = 5^2 - d^2$, where d is the distance from the wall. [3 marks]
-
-

D**Challenge** *multi-step and problem-solving*

/ 11 marks

- 1 A box is 60 cm long, 45 cm wide and 20 cm high. Find the length of the longest straight rod that fits inside it, correct to 1 decimal place. [3 marks]

.....

.....

Answer: _____

- 2 A 6.5 m ladder reaches 6 m up a wall. The foot then slides 0.8 m further away from the wall. How far does the top of the ladder slide down? [3 marks]

.....

.....

Answer: _____

- 3 Point P is on the x-axis and is the same distance from (0, 4) as from (8, 0). Find P and that distance. [3 marks]

.....

.....

Answer: _____

- 4 An ant walks on the outside of a cube with 10 cm edges, from one corner to the opposite corner. Find the length of its shortest path to 1 decimal place. (Hint: unfold two faces.) [2 marks]

.....

.....

Answer: _____

How did I go?Fluency ____ / 16 Core ____ / 23 Reasoning ____ / 9 Challenge ____ / 11 **Total ____ / 59**

Stuck on a section? Our Year 8 tutors can show you exactly what to practise next. **Book a free trial class at**
edulift.com.au