MATHEMATICS

Stage 4

Measurement and Space

Right-angled Triangles

Teacher: Chi Binh Le

Exam Equivalent Time: 157.5 minutes *(based on allocation ~1.25 min/mark)*

norWEST CHRISTIAN COLLEGE
STRENGTH OF PURPOSE

Questions

1. E Right-angled Triangles (255475) Core

Which of the following is true of the hypotenuse in a right-angled triangle?

A. The hypotenuse is the side opposite to the right angle.

B. The hypotenuse is the side adjacent to the right angle.

C. The hypotenuse is one of the shorter sides in a right angled triangle.

D. The hypotenuse is equal to the sum of the square of the other two sides.

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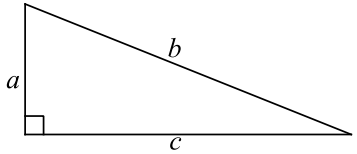
2. D Right-angled Triangles (255281) Core

Which of the following correctly states Pythagoras' Theorem for this triangle?



A. $c^2 = a^2 + b^2$

B. $b^2 = c^2 - a^2$

C. $a^2 = b^2 + c^2$

D. $b^2 = a^2 + c^2$

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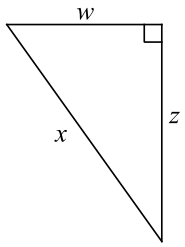
3. D Right-angled Triangles (255289) Core

Which of the following correctly states Pythagoras' Theorem for this triangle?



A. $w^2 = x^2 + z^2$

B. $x^2 = w^2 + z^2$

C. $z^2 = x^2 + w^2$

D. $x^2 = w^2 - z^2$

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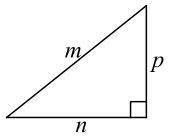
4. D Right-angled Triangles (255291) Core

Which of the following correctly states Pythagoras' Theorem for this triangle?



A. $m^2 = n^2 + p^2$

B. $p^2 = m^2 + n^2$

C. $n^2 = p^2 + m^2$

D. $n^2 = m^2 - p^2$

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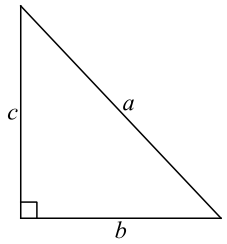
5. D Right-angled Triangles (255287) Core

Which of the following correctly states Pythagoras' Theorem for this triangle?



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

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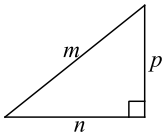
6. D Right-angled Triangles (255293) Core

Which of the following correctly states Pythagoras' Theorem for this triangle?



A. $m^2 = n^2 - p^2$
B. $p^2 = m^2 - n^2$
C. $n^2 = p^2 - m^2$
D. $n^2 = m^2 + p^2$

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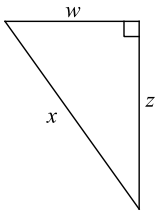
7. D Right-angled Triangles (255297) Core

Which of the following correctly states Pythagoras' Theorem for this triangle?



A. $w^2 = x^2 + z^2$
B. $z^2 = w^2 - x^2$
C. $x^2 = z^2 - w^2$
D. $w^2 = x^2 - z^2$

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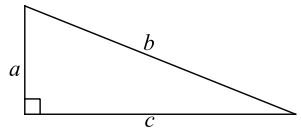
8. D Right-angled Triangles (255299) Core

Which of the following correctly states Pythagoras' Theorem for this triangle?



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

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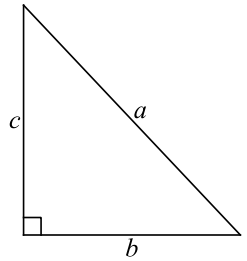
9. D Right-angled Triangles (255295) Core

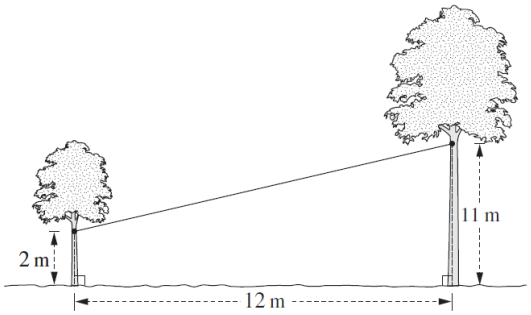
Which of the following correctly states Pythagoras' Theorem for this triangle?



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

10. C Right-angled Triangles (002611) Core HSC

Two trees on level ground, 12 metres apart, are joined by a cable. It is attached 2 metres above the ground to one tree and 11 metres above the ground to the other.



NOT TO SCALE

What is the length of the cable between the two trees, correct to the nearest metre?

A. 9 m

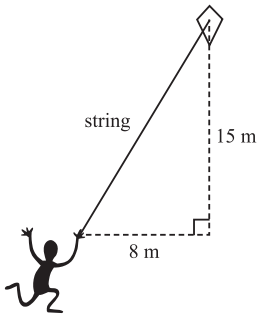
B. 12 m

C. 15 m

D. 16 m

11. C Right-angled Triangles (255274) Core

Henry flies a kite attached to a long string, as shown in the diagram below.



The horizontal distance of the kite to Henry's hand is 8 m.

The vertical distance of the kite above Henry's hand is 15 m.

The length of the string, in metres, is

A. 13

B. 17

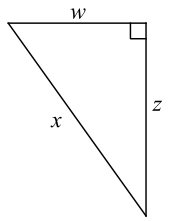
C. 23

D. 289

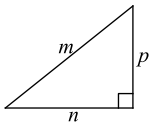
12. E Right-angled Triangles (255484) Core

Which side is the hypotenuse in these right angled triangles? *(3 marks)*

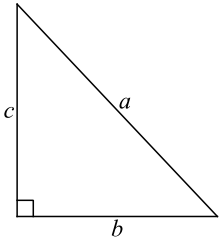
a.



b.



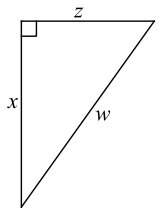
c.



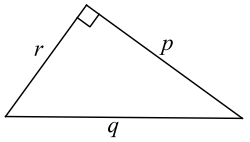
13. E Right-angled Triangles (255497) Core

Which side is the hypotenuse in these right angled triangles? *(3 marks)*

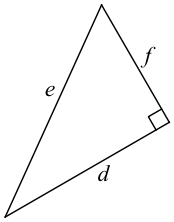
a.



b.

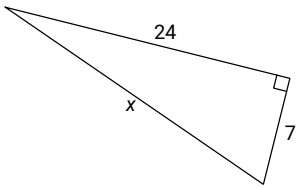


c.



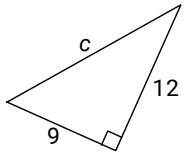
14. C Right-angled Triangles (255728) Core

Find the value of the pronumeral in the right-angled triangle below. *(2 marks)*



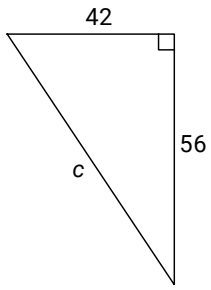
15. C Right-angled Triangles (255736) Core

Find the value of the pronumeral in the right-angled triangle below. *(2 marks)*



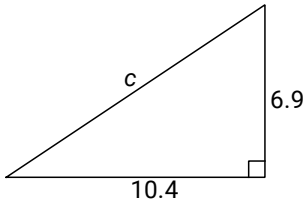
16. C Right-angled Triangles (255744) Core

Find the value of the pronumeral in the right-angled triangle below. ***(2 marks)***



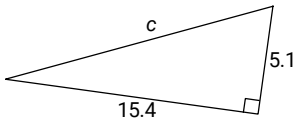
17. C Right-angled Triangles (255749) Core

Find the value of the pronumeral in the right-angled triangle below, giving your answer correct to 1 decimal place. ***(2 marks)***



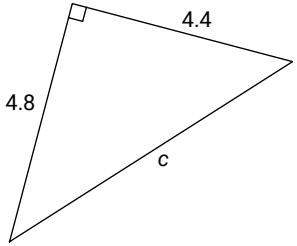
18. C Right-angled Triangles (255756) Core

Find the value of the pronumeral in the right-angled triangle below, giving your answer correct to 1 decimal place. ***(2 marks)***



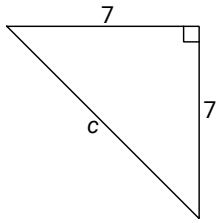
19. C Right-angled Triangles (255758) Core

Find the value of the pronumeral in the right-angled triangle below, giving your answer correct to 1 decimal place. ***(2 marks)***



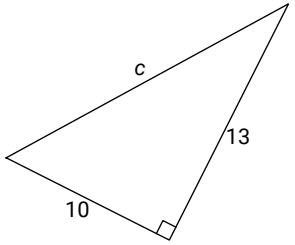
20. C Right-angled Triangles (255760) Core

Find the value of the pronumeral in the right-angled triangle below, giving your answer in exact surd form. ***(2 marks)***



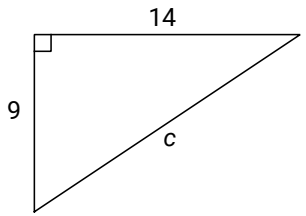
21. C Right-angled Triangles (255767) Core

Find the value of the pronumeral in the right-angled triangle below, giving your answer in exact surd form. ***(2 marks)***



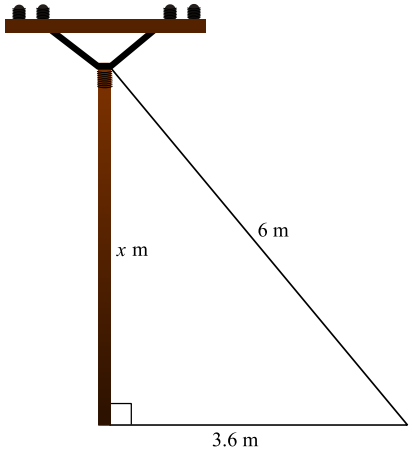
22. C Right-angled Triangles (255770) Core

Find the value of the pronumeral in the right-angled triangle below, giving your answer in exact surd form. *(2 marks)*



23. C Right-angled Triangles (255591) Core

Find the height of the power pole below correct to one decimal place. *(2 marks)*

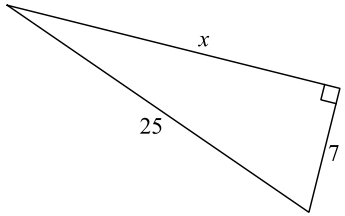


24. C Right-angled Triangles (255512) Core

Use Pythagoras' Theorem to decide if the numbers **5, 12** and **13** form a Pythagorean triad. *(2 marks)*

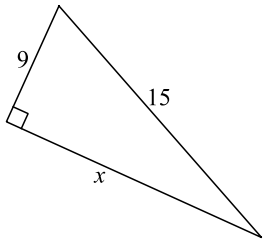
25. B Right-angled Triangles (255600) Core

Find the value of the pronumeral in the right-angled triangle below. *(2 marks)*



26. B Right-angled Triangles (255605) Core

Find the value of the pronumeral in the right-angled triangle below. *(2 marks)*

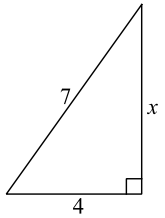


27. B Right-angled Triangles (255532) Core

Use Pythagoras' Theorem to decide if the numbers **12, 35** and **37** form a Pythagorean triad. *(2 marks)*

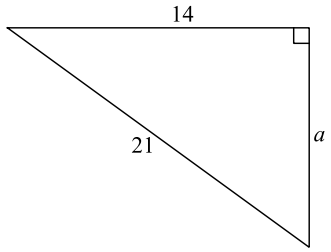
28. B Right-angled Triangles (255608) Core

Find the value of the pronumeral in the right-angled triangle below correct to one decimal place. *(2 marks)*



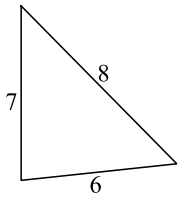
29. B Right-angled Triangles (255617) Core

Find the value of the pronumeral in the right-angled triangle below correct to one decimal place. *(2 marks)*



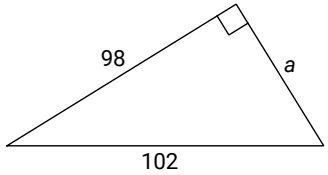
30. B Right-angled Triangles (255576) Core

Use Pythagoras' Theorem to decide if the triangle below is right-angled. *(2 marks)*



31. B Right-angled Triangles (255623) Core

Find the value of the pronumeral in the right-angled triangle below correct to one decimal place. *(2 marks)*



32. B Right-angled Triangles (255536) Core

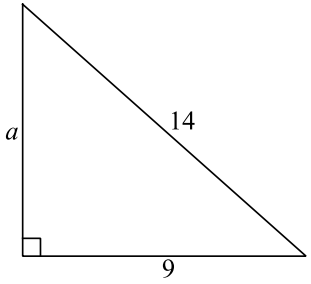
Use Pythagoras' Theorem to decide if the numbers **1.1**, **6** and **6.1** form a Pythagorean triad. *(2 marks)*

33. B Right-angled Triangles (255538) Core

Use Pythagoras' Theorem to decide if the numbers **36**, **48** and **63** form a Pythagorean triad. *(2 marks)*

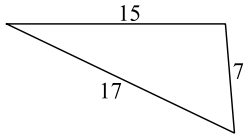
34. B Right-angled Triangles (255626) Core

Find the value of the pronumeral in the right-angled triangle below giving your answer in exact surd form. *(2 marks)*



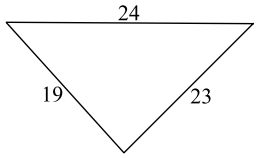
35. B Right-angled Triangles (255584) Core

Use Pythagoras' Theorem to decide if the triangle below is right-angled. *(2 marks)*



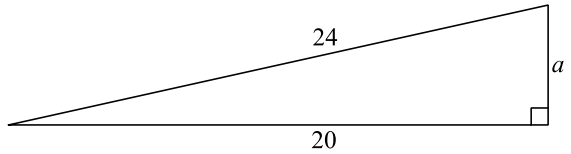
36. B Right-angled Triangles (255586) Core

Use Pythagoras' Theorem to decide if the triangle below is right-angled. *(2 marks)*



37. B Right-angled Triangles (255631) Core

Find the value of the pronumeral in the right-angled triangle below giving your answer in exact surd form. *(2 marks)*

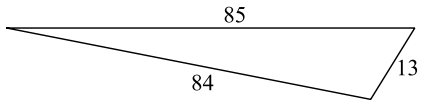


38. B Right-angled Triangles (255550) Core

Use Pythagoras' Theorem to decide if the numbers **1.4**, **4.8** and **5.2** form a Pythagorean triad. *(2 marks)*

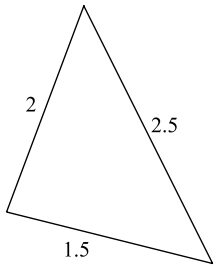
39. B Right-angled Triangles (255573) Core

Use Pythagoras' Theorem to decide if the triangle below is right-angled. *(2 marks)*



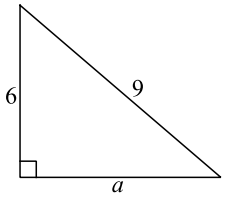
40. B Right-angled Triangles (255569) Core

Use Pythagoras' Theorem to decide if the triangle below is right-angled. ***(2 marks)***



41. B Right-angled Triangles (255634) Core

Find the value of the pronumeral in the right-angled triangle below giving your answer in exact surd form. ***(2 marks)***

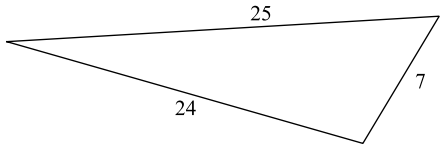


42. B Right-angled Triangles (255555) Core

Use Pythagoras' Theorem to decide if the numbers $7, 8$ and 11 form a Pythagorean triad. ***(2 marks)***

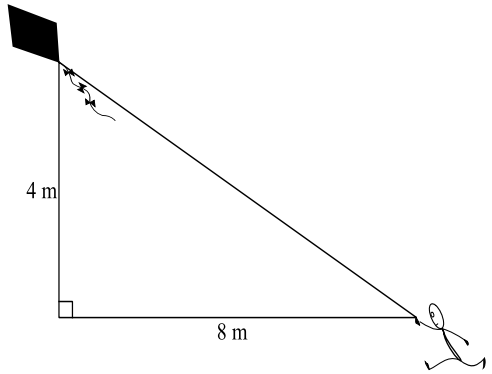
43. B Right-angled Triangles (255561) Core

Use Pythagoras' Theorem to decide if the triangle below is right-angled. ***(2 marks)***



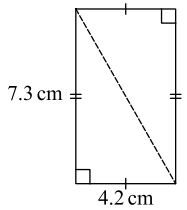
44. B Right-angled Triangles (255898) Core

Lewis is holding a string attached to a kite. Lewis is 8 metres from the kite and the kite is flying 4 metres above his hand. Use Pythagoras' Theorem to calculate the length of the string attached to the kite, correct to 2 decimal places. ***(2 marks)***



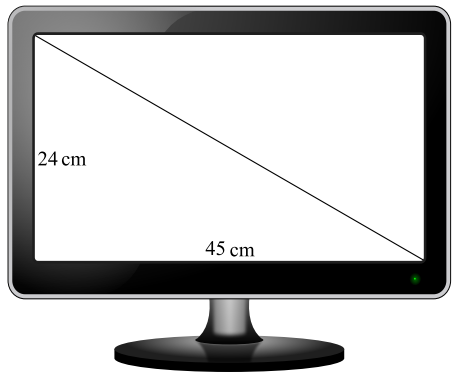
45. B Right-angled Triangles (255937) Core

Use Pythagoras' Theorem to calculate the length of the diagonal in the rectangle below, correct to 1 decimal place. ***(2 marks)***



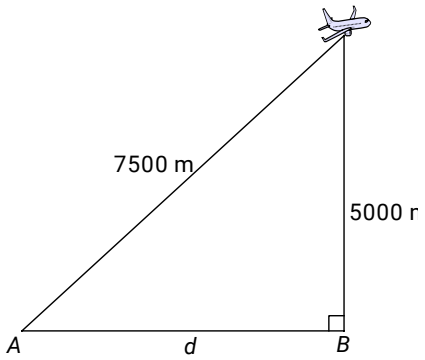
46. B Right-angled Triangles (255948) Core

The size of a computer monitor is determined by the length of the diagonal of the screen. Use Pythagoras' Theorem to calculate the size of the monitor in the diagram below. ***(2 marks)***



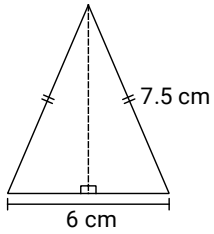
47. A Right-angled Triangles (255695) Core

Arthur observes a plane through his binoculars at a distance of 7500 metres. If Ben is directly under the plane and it is flying at an altitude of 5000 metres, how far apart are Arthur and Ben? Give your answer correct to the nearest metre. ***(2 Marks)***



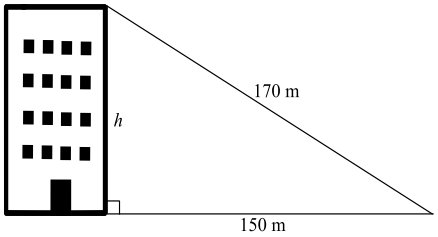
48. A Right-angled Triangles (255772) Core

Calculate the perpendicular height of the isosceles triangle below, giving your answer correct to one decimal place. ***(2 marks)***



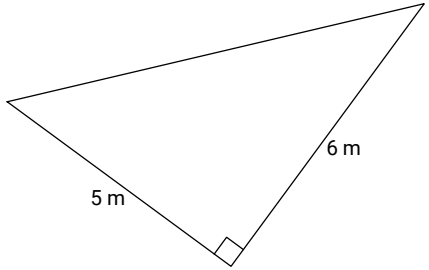
49. A Right-angled Triangles (255842) Core

Use Pythagoras' Theorem to calculate the height of the building below. ***(2 marks)***



50. A Right-angled Triangles (255959) Core

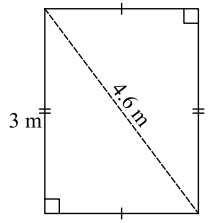
a. Calculate the length of the hypotenuse in the following right-angled triangle. Give your answer correct to the nearest metre. ***(2 marks)***



b. Find the perimeter of the triangle. ***(1 mark)***

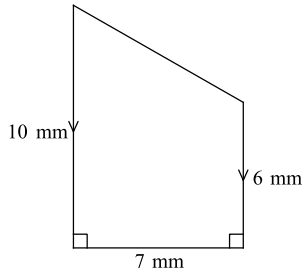
51. A Right-angled Triangles (256057) Core

Use Pythagoras' Theorem to calculate the perimeter of the rectangle below, correct to 1 decimal place. ***(3 marks)***



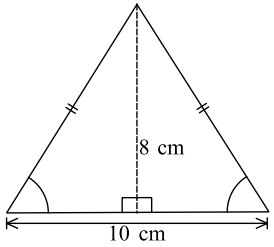
52. A Right-angled Triangles (256072) Core

Use Pythagoras' Theorem to calculate the perimeter of the trapezium below, correct to 1 decimal place. ***(3 marks)***



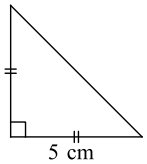
53. A Right-angled Triangles (256077) Core

Use Pythagoras' Theorem to calculate the perimeter of the isosceles triangle below, correct to the nearest centimetre. ***(3 marks)***

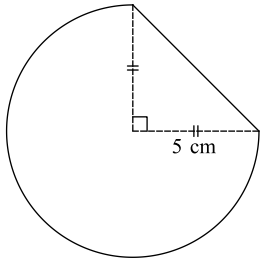


54. A+ Right-angled Triangles (256091) Core

a. Use Pythagoras' Theorem to calculate the length of the hypotenuse in the isosceles triangle below. Give your answer correct in exact surd form. ***(2 marks)***

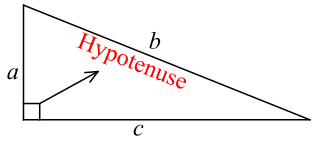


b. Using your result from part (a) above, calculate the perimeter of the shape below, correct to 1 decimal place. ***(2 marks)***



Worked Solutions

1. E Right-angled Triangles (255475) Core



The hypotenuse is the side opposite to the right angle.

$\Rightarrow A$

2. D Right-angled Triangles (255281) Core

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

$\Rightarrow D$

3. D Right-angled Triangles (255289) Core

$x^2 = w^2 + z^2$

$\Rightarrow B$

4. D Right-angled Triangles (255291) Core

$m^2 = n^2 + p^2$

$\Rightarrow A$

5. D Right-angled Triangles (255287) Core

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

$\Rightarrow C$

6. D Right-angled Triangles (255293) Core

$p^2 = m^2 - n^2$

$\Rightarrow B$

7. D Right-angled Triangles (255297) Core

$w^2 = x^2 - z^2$

$\Rightarrow D$

8. D Right-angled Triangles (255299) Core

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

$\Rightarrow C$

---

9. D Right-angled Triangles (255295) Core

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

$\Rightarrow A$

---

10. C Right-angled Triangles (002611) Core HSC

Using Pythagoras

$c^2 = 12^2 + 9^2$

$= 144 + 81$

$= 225$

$\therefore c = 15, \quad c > 0$

$\Rightarrow C$

---

11. C Right-angled Triangles (255274) Core

Using Pythagoras

$s^2 = 8^2 + 15^2$

$= 289$

$\therefore \ s = \sqrt{289}$

$= 17$ metres

$\Rightarrow B$

---

12. E Right-angled Triangles (255484) Core

a. Side: x

b. Side: m

c. Side: a

---

13. E Right-angled Triangles (255497) Core

a. Side: w

b. Side: q

c. Side: e

---

14. C Right-angled Triangles (255728) Core

Pythagoras' Theorem states: $c^2 = a^2 + b^2$

Let $a = 24$, $b = 7$ and $c = x$

Then $x^2 = 24^2 + 7^2$

$x^2 = 625$

$x = \sqrt{625}$

$x = 25$

---

15. C Right-angled Triangles (255736) Core

Pythagoras' Theorem states: $c^2 = a^2 + b^2$

Let $a = 9$, and $b = 12$

Then $c^2 = 9^2 + 12^2$

$c^2 = 225$

$c = \sqrt{225}$

$c = 15$

---

16. C Right-angled Triangles (255744) Core

Pythagoras' Theorem states: $c^2 = a^2 + b^2$

Let $a = 42$, and $b = 56$

Then $c^2 = 42^2 + 56^2$

$c^2 = 4900$

$c = \sqrt{4900}$

$c = 70$

---

17. C Right-angled Triangles (255749) Core

Pythagoras' Theorem states: $c^2 = a^2 + b^2$

Let $a = 10.4$, and $b = 6.9$

Then $c^2 = 10.4^2 + 6.9^2$

$c^2 = 155.77$

$c = \sqrt{155.77}$

$c = 12.480\ldots$

$c \approx 12.5$ (1 d.p.)

---

18. C Right-angled Triangles (255756) Core

Pythagoras' Theorem states: $c^2 = a^2 + b^2$
Let $a = 15.4$, and $b = 5.1$

Then $c^2 = 15.4^2 + 5.1^2$
$c^2 = 263.17$
$c = \sqrt{263.17}$
$c = 16.222\ldots$
$c \approx 16.2$ (1 d.p.)

---

19. C Right-angled Triangles (255758) Core

Pythagoras' Theorem states: $c^2 = a^2 + b^2$
Let $a = 4.8$, and $b = 4.4$

Then $c^2 = 4.8^2 + 4.4^2$
$c^2 = 42.4$
$c = \sqrt{42.4}$
$c = 6.511\ldots$
$c \approx 6.5$ (1 d.p.)

---

20. C Right-angled Triangles (255760) Core

Pythagoras' Theorem states: $c^2 = a^2 + b^2$
Let $a = 7$, and $b = 7$

Then $c^2 = 7^2 + 7^2$
$c^2 = 98$
$c = \sqrt{98}$

---

21. C Right-angled Triangles (255767) Core

Pythagoras' Theorem states: $c^2 = a^2 + b^2$
Let $a = 10$, and $b = 13$

Then $c^2 = 10^2 + 13^2$
$c^2 = 269$
$c = \sqrt{269}$

---

22. C Right-angled Triangles (255770) Core

Pythagoras' Theorem states: $c^2 = a^2 + b^2$
Let $a = 9$, and $b = 14$

Then $c^2 = 9^2 + 14^2$
$c^2 = 277$
$c = \sqrt{277}$

---

23. C Right-angled Triangles (255591) Core

Let $a = x$, $b = 3.6$ and $c = 6$
Pythagoras' Theorem states: $a^2 + b^2 = c^2$

$x^2 + 3.6^2 = 6^2$
$x^2 + 12.96 = 36$
$x^2 = 36 - 12.96$
$x^2 = 23.04$
$\therefore x = \sqrt{23.04}$
$= 4.8$
$\therefore$ The height of the power pole is 4.8 m

---

24. C Right-angled Triangles (255512) Core

Let $a = 5$, $b = 12$ and $c = 13$
Pythagoras' Theorem states: $a^2 + b^2 = c^2$

LHS: $\longrightarrow a^2 + b^2 = 5^2 + 12^2$
$= 25 + 144$
$= 169$
$= 13^2 =$ RHS
$\therefore$ 5, 12 and 13 form a Pythagorean triad.

---

25. B Right-angled Triangles (255600) Core

Pythagoras' Theorem states: $a^2 + b^2 = c^2$
Let $a = x$, $b = 7$ and $c = 25$

$x^2 + 7^2 = 25^2$
$x^2 + 49 = 625$
$x^2 = 625 - 49$
$x^2 = 576$
$\therefore x = \sqrt{576}$
$= 24$

---

26. B Right-angled Triangles (255605) Core

Pythagoras' Theorem states: $a^2 + b^2 = c^2$

Let $a = x,\ b = 7$ and $c = 25$

$$x^2 + 9^2 = 15^2$$
$$x^2 + 81 = 225$$
$$x^2 = 225 - 81$$
$$x^2 = 144$$
$$\therefore x = \sqrt{144}$$
$$= 12$$

---

27. B Right-angled Triangles (255532) Core

Let $a = 12,\ b = 35$ and $c = 37$

Pythagoras' Theorem states: $a^2 + b^2 = c^2$

$$\text{LHS:} \longrightarrow a^2 + b^2 = 12^2 + 35^2$$
$$= 144 + 1225$$
$$= 1369$$
$$= 37^2 = \text{RHS}$$

$\therefore$ 12, 35 and 37 form a Pythagorean triad.

---

28. B Right-angled Triangles (255608) Core

Pythagoras' Theorem states: $a^2 + b^2 = c^2$

Let $a = x,\ b = 4$ and $c = 7$

$$x^2 + 4^2 = 7^2$$
$$x^2 + 16 = 49$$
$$x^2 = 49 - 16$$
$$x^2 = 33$$
$$\therefore x = \sqrt{33}$$
$$= 5.744\cdots \approx 5.7 \text{ (1 d.p.)}$$

---

29. B Right-angled Triangles (255617) Core

Pythagoras' Theorem states: $a^2 + b^2 = c^2$

Let $b = 14$ and $c = 21$

$$a^2 + 14^2 = 21^2$$
$$a^2 + 196 = 441$$
$$a^2 = 441 - 196$$
$$a^2 = 245$$
$$\therefore a = \sqrt{245}$$
$$= 15.652\cdots \approx 15.7 \text{ (1 d.p.)}$$

---

30. B Right-angled Triangles (255576) Core

Let $a = 6,\ b = 7$ and $c = 8$

Pythagoras' Theorem states: $a^2 + b^2 = c^2$

$$\text{LHS:} \rightarrow a^2 + b^2 = 6^2 + 7^2$$
$$= 36 + 49$$
$$= 85$$
$$\neq 8^2$$
$$\therefore \text{LHS} \neq \text{RHS}$$

$\therefore$ The triangle is not right-angled as the sides do not form a Pythagorean triad.

---

31. B Right-angled Triangles (255623) Core

Pythagoras' Theorem states: $a^2 + b^2 = c^2$

Let $b = 98$ and $c = 102$

$$a^2 + 98^2 = 102^2$$
$$a^2 + 9604 = 10404$$
$$a^2 = 10404 - 9604$$
$$a^2 = 800$$
$$\therefore a = \sqrt{800}$$
$$= 28.284\cdots \approx 28.3 \text{ (1 d.p.)}$$

---

32. B Right-angled Triangles (255536) Core

Let $a = 1.1,\ b = 6$ and $c = 6.1$

Pythagoras' Theorem states: $a^2 + b^2 = c^2$

$$\begin{aligned}\text{LHS:} \longrightarrow a^2 + b^2 &= 1.1^2 + 6^2 \\ &= 1.21 + 36 \\ &= 37.21 \\ &= 6.1^2 = \text{RHS}\end{aligned}$$

$\therefore$ 1.1, 6 and 6.1 form a Pythagorean triad.

---

33. B Right-angled Triangles (255538) Core

Let $a = 36,\ b = 48$ and $c = 63$

Pythagoras' Theorem states: $a^2 + b^2 = c^2$

$$\begin{aligned}\text{LHS:} \longrightarrow a^2 + b^2 &= 36^2 + 48^2 \\ &= 1296 + 2304 \\ &= 3600 \\ &= 60^2 \neq \text{RHS}\end{aligned}$$

$\therefore$ 36, 48 and 63 do not form a Pythagorean triad.

---

34. B Right-angled Triangles (255626) Core

Pythagoras' Theorem states: $a^2 + b^2 = c^2$

Let $b = 9$ and $c = 14$

$$\begin{aligned}a^2 + 9^2 &= 14^2 \\ a^2 + 81 &= 196 \\ a^2 &= 196 - 81 \\ a^2 &= 115 \\ \therefore a &= \sqrt{115}\end{aligned}$$

---

35. B Right-angled Triangles (255584) Core

Let $a = 7,\ b = 15$ and $c = 17$

Pythagoras' Theorem states: $a^2 + b^2 = c^2$

$$\begin{aligned}\text{LHS:} \rightarrow a^2 + b^2 &= 7^2 + 15^2 \\ &= 49 + 225 \\ &= 274 \\ &\neq 17^2 \\ &\therefore \text{LHS} \neq \text{RHS}\end{aligned}$$

$\therefore$ The triangle is not right-angled as the sides do not form a Pythagorean triad.

---

36. B Right-angled Triangles (255586) Core

Let $a = 19,\ b = 23$ and $c = 24$

Pythagoras' Theorem states: $a^2 + b^2 = c^2$

$$\begin{aligned}\text{LHS:} \rightarrow a^2 + b^2 &= 19^2 + 23^2 \\ &= 361 + 529 \\ &= 890 \\ &\neq 24^2 \\ &\therefore \text{LHS} \neq \text{RHS}\end{aligned}$$

$\therefore$ The triangle is not right-angled as the sides do not form a Pythagorean triad.

---

37. B Right-angled Triangles (255631) Core

Pythagoras' Theorem states: $a^2 + b^2 = c^2$

Let $b = 20$ and $c = 24$

$$\begin{aligned}a^2 + 20^2 &= 24^2 \\ a^2 + 400 &= 576 \\ a^2 &= 576 - 400 \\ a^2 &= 176 \\ \therefore a &= \sqrt{176}\end{aligned}$$

---

38. B Right-angled Triangles (255550) Core

Let $a = 1.4,\ b = 4.8$ and $c = 5.2$

Pythagoras' Theorem states: $a^2 + b^2 = c^2$

$$\begin{aligned}\text{LHS:} \rightarrow a^2 + b^2 &= 1.4^2 + 4.8^2 \\ &= 1.96 + 23.04 \\ &= 25 \\ &= 5^2 \neq \text{RHS}\end{aligned}$$

$\therefore$ 1.4, 4.8 and 5.2 do not form a Pythagorean triad.

---

39. B Right-angled Triangles (255573) Core

Let $a = 13,\ b = 84$ and $c = 85$

Pythagoras' Theorem states: $a^2 + b^2 = c^2$

$$\begin{aligned}\text{LHS:} \rightarrow a^2 + b^2 &= 13^2 + 84^2 \\ &= 169 + 7056 \\ &= 7225 \\ &= 85^2 \\ &= \text{RHS}\end{aligned}$$

$\therefore$ The triangle is right-angled as the sides form a Pythagorean triad.

---

40. B Right-angled Triangles (255569) Core

Let $a = 1.5,\ b = 2$ and $c = 2.5$

Pythagoras' Theorem states: $a^2 + b^2 = c^2$

$$\begin{aligned}\text{LHS:} \rightarrow a^2 + b^2 &= 1.5^2 + 2^2 \\ &= 2.25 + 4 \\ &= 6.25 \\ &= 2.5^2 \\ &= \text{RHS}\end{aligned}$$

$\therefore$ The triangle is right-angled as the sides form a Pythagorean triad.

---

41. B Right-angled Triangles (255634) Core

Pythagoras' Theorem states: $a^2 + b^2 = c^2$

Let $b = 6$ and $c = 9$

$$\begin{aligned}a^2 + 6^2 &= 9^2 \\ a^2 + 36 &= 81 \\ a^2 &= 81 - 36 \\ a^2 &= 45 \\ \therefore a &= \sqrt{45}\end{aligned}$$

---

42. B Right-angled Triangles (255555) Core

Let $a = 7,\ b = 8$ and $c = 11$

Pythagoras' Theorem states: $a^2 + b^2 = c^2$

$$\begin{aligned}\text{LHS:} \rightarrow a^2 + b^2 &= 7^2 + 8^2 \\ &= 49 + 64 \\ &= 113 \\ &\neq 11^2 \\ \therefore &\neq \text{RHS}\end{aligned}$$

$\therefore$ 7, 8 and 11 do not form a Pythagorean triad.

---

43. B Right-angled Triangles (255561) Core

Let $a = 24,\ b = 7$ and $c = 25$

Pythagoras' Theorem states: $a^2 + b^2 = c^2$

$$\begin{aligned}\text{LHS:} \rightarrow a^2 + b^2 &= 24^2 + 7^2 \\ &= 576 + 49 \\ &= 625 \\ &= 25^2 \\ &= \text{RHS}\end{aligned}$$

$\therefore$ The triangle is right-angled as the sides form a Pythagorean triad.

---

44. B Right-angled Triangles (255898) Core

Pythagoras' Theorem states: $c^2 = a^2 + b^2$

Let $a = 4$ and $b = 8$

$$\begin{aligned}\text{Then } c^2 &= 4^2 + 8^2 \\ c^2 &= 80 \\ c &= \sqrt{80} \\ c &= 8.9442\cdots \approx 8.94 \text{ (2 d.p.)}\end{aligned}$$

The length of the string is 8.94 metres (2 d.p.)

---

45. B Right-angled Triangles (255937) Core

Pythagoras' Theorem states: $c^2 = a^2 + b^2$

Let $a = 4.2$ and $b = 7.3$

$$\begin{aligned}\text{Then } c^2 &= 4.2^2 + 7.3^2 \\ c^2 &= 70.98 \\ c &= \sqrt{70.98} \\ c &= 8.4219\cdots \approx 8.4 \text{ (1 d.p.)}\end{aligned}$$

The length of the string is 8.4 centimetres (1 d.p.)

---

46. B Right-angled Triangles (255948) Core

Pythagoras' Theorem states: $c^2 = a^2 + b^2$

Let $a = 24$ and $b = 45$

$$\begin{aligned}\text{Then } c^2 &= 24^2 + 45^2 \\ c^2 &= 2601 \\ c &= \sqrt{2601} \\ c &= 51\end{aligned}$$

The size of the monitor is 51 centimetres

---

47. A Right-angled Triangles (255695) Core

Using Pythagoras' Theorem: $a^2 + b^2 = c^2$

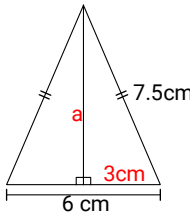
Let $a = d$, $b = 5000$, $c = 7500$

$$d^2 + 5000^2 = 7500^2$$
$$d^2 = 7500^2 - 5000^2$$
$$d^2 = 31\,250\,000$$
$$d = 5590\ldots$$
$$d \approx 5590$$

$\therefore$ Arthur and Ben are approximately 5590 metres apart.

---

48. A Right-angled Triangles (255772) Core



Pythagoras' Theorem states: $a^2 + b^2 = c^2$

Let $b = 3$ and $c = 7.5$

$$a^2 + 3^2 = 7.5^2$$
$$a^2 = 7.5^2 - 3^2$$
$$a^2 = 47.25$$
$$a = \sqrt{46.01}$$
$$a = 6.873\cdots \approx 6.9 \text{ (1 d.p.)}$$

---

49. A Right-angled Triangles (255842) Core

Pythagoras' Theorem states: $a^2 + b^2 = c^2$

Let $a = h$, $b = 150$ and $c = 170$

$$h^2 + 150^2 = 170^2$$
$$h^2 = 170^2 - 150^2$$
$$h^2 = 6400$$
$$h = \sqrt{6400}$$
$$h = 80$$

The height of the building is 80 metres.

---

50. A Right-angled Triangles (255959) Core

a. Pythagoras' Theorem states: $c^2 = a^2 + b^2$

Let $a = 5$ and $b = 6$

Then $c^2 = 5^2 + 6^2$
$$c^2 = 61$$
$$c = \sqrt{61}$$
$$c = 7.141\cdots \approx 7$$

The hypotenuse is 7 metres (nearest metre)

b. Perimeter
$$= 7 + 5 + 6$$
$$= 18 \text{ m}$$

---

51. A Right-angled Triangles (256057) Core

Find side length of rectangle.

Pythagoras' Theorem states: $a^2 + b^2 = c^2$

Let $b = 3$ and $c = 4.6$

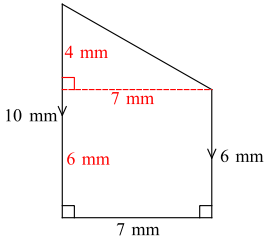
Then $a^2 + 3^2 = 4.6^2$
$$a^2 = 4.6^2 - 3^2$$
$$a = \sqrt{12.16}$$
$$a = 3.487\ldots$$

Perimeter
$$= 2 \times 3.487\cdots + 2 \times 3$$
$$= 12.974\cdots \approx 13.0 \text{ m (1 d.p.)}$$

---

52. A Right-angled Triangles (256072) Core

Find length of sloped side of trapezium.



Pythagoras' Theorem states: $c^2 = a^2 + b^2$

\(\text{Let }a=4\ \text{and }b=7)

Then $c^2 = 4^2 + 7^2$

$c^2 = 65$

$c = \sqrt{65}$

$c = 8.062\ldots$

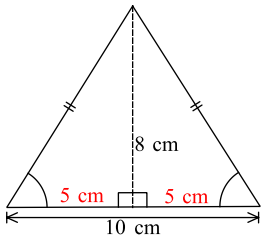
Perimeter

$= 6 + 7 + 10 + 8.062\ldots$

$= 31.062\cdots \approx 31.1$ mm (1 d.p.)

53. A Right-angled Triangles (256077) Core

Find length of the equal sides of the triangle.



Pythagoras' Theorem states: $c^2 = a^2 + b^2$

Let $a = 5$ **and** $b = 8$

Then $c^2 = 5^2 + 8^2$

$c^2 = 89$

$c = \sqrt{89}$

$c = 9.433\ldots$

Perimeter

$= 2 \times 9.433\cdots + 10$

$= 28.867\cdots \approx 29$ cm (nearest cm)

54. A+ Right-angled Triangles (256091) Core

a. **Pythagoras' Theorem states:** $c^2 = a^2 + b^2$

Let $a = 5$ **and** $b = 5$

Then $c^2 = 5^2 + 5^2$

$c^2 = 50$

$c = \sqrt{50}$ cm (exact surd form)

b. **Perimeter** $=$ **chord (a)** $+ \frac{3}{4} \times$ **circumference**

$= \sqrt{50} + \frac{3}{4} \times 2\pi r$

$= \sqrt{50} + \frac{3}{4} \times 2\pi \times 5$

$= 30.633\ldots$

≈ 30.6 cm (1 d.p.)