Multiple-choice section

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Question | 1 | 2 | 3 | 4 | 5 | 6 |
| Answer | D | A | B | C | C | B |

Question 1 [2.1]

D

The hypotenuse is labelled *q*.  
From Pythagoras’ theorem, *p*2 + *r*2 = *q*2.

Question 2 [2.2]

A

The hypotenuse is labelled *H*.  
From Pythagoras’ theorem, *H*2 = 6.32 + 4.22.

Question 3 [2.3]

B

The hypotenuse is 27.  
From Pythagoras’ theorem:  
*x*2 + 202 = 272*x*2 + 400 = 729  
Subtract 400 from both sides of the equation.  
*x*2 = 329

*x* =

Question 4 [2.4]

C

The top of the ladder is 2.3 m from the floor.

Question 5 [2.5]

C

When the numbers in (9, 40, 41) are multiplied by 3, the new triple is (27, 120, 123).

Question 6 [2.2]

B

*h*2 = 3.82 + 9.32

*h*2 = 14.44 + 86.49

*h*2 = 100.93

*h* = 

*h* = 10.0463…

*h* ≈ 10.05 (2 d.p.)

Multiple-choice total marks: 6

Short answer section

Question 7 3 marks [2.1, 2.2]

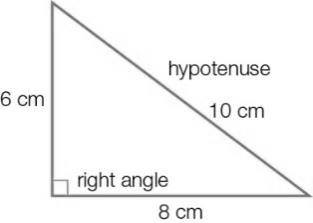
In a right-angled triangle, the hypotenuse is always longer than the other two sides.  
The right angle in a right-angled triangle is opposite the hypotenuse.  
To find the length of the hypotenuse, the first step is to add the squares of the other two sides.

Question 8 2 marks [2.1]

|  |  |
| --- | --- |
| **(a)** The hypotenuse is the longest side, *XY*.  The right angle is at *W*, opposite to *XY*. | **(b)** The hypotenuse is the longest side, *DF*. The right angle is at *E*, opposite to *DF*. |

Question 9 1 mark [2.1]

Student working should be close to actual measurements.



Question 10 2 marks [2.2]

5.72 + 4.22 = 32.49 + 17.64 = 50.13

7.22 = 51.84

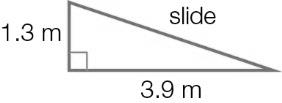
5.72 + 4.22 ≠ 7.22

The room is not ‘square’ as the corner is not a right angle.

Question 11 6 marks [2.4]

|  |  |
| --- | --- |
| **(a)** | **(b)** |

**(c)**



Question 12 3 marks [2.2]

*q*2 = 3.72 + 8.92

*q*2 = 13.69 + 79.21

*q*2 = 92.90

*q* = 

*q* = 9.638 46…

*q* ≈ 9.64 (2 d.p.)

Question 13 2 marks [2.3]

The hypotenuse is 14.55.  
From Pythagoras’ theorem:  
*a*2 + 11.752 = 14.552*a*2 + 138.0625 = 211.7025  
Subtract 138.0625 from both sides of the equation.  
*a*2 = 73.64

*a* =  
 *a* ≈ 8.58 (2 d.p.)

Question 14 2 marks [2.3]

The hypotenuse is 15.  
From Pythagoras’ theorem:  
*m*2 + 132 = 152*m*2 + 169 = 225  
Subtract 169 from both sides of the equation.  
*m*2 = 56

*m* =

Question 15 3 marks [2.4]

Set 1:

202 + 482 = 400 + 2304 = 2704

512 = 2601

202 + 482 ≠ 512 so Set 1 is not a Pythagorean triple.

Set 2:

222 + 1202 = 484 + 14 400 = 14 884

1222 = 14 884

222 + 1202 = 1222 so Set 2 is a Pythagorean triple.

Short answer total marks: 24

Extended answer section

Question 16 5 marks [2.1, 2.5]

(a) Using the Pythagorean triple (3, 4, 5), *x* = 4.

Multiplying the numbers in (3, 4, 5) by 3 gives (9, 12, 15); *y* = 15.

(b) *a* is the hypotenuse of a right-angled triangle with shorter sides of 3 and 9.

*a*2 = 32 + 92

*b* is the hypotenuse of a right-angled triangle with shorter sides of 5 and 5 (from equal side marking).  
*b*2 = 52 + 52 or *b*2 = 2× 52

Question 17 5 marks [2.3, 2.4]

(a) The 18.5 m long wire is the hypotenuse of a right-angled triangle. One of the shorter sides is formed by 17.5 m of the flagpole.

Let *x* m be the distance between the base of the flagpole and a peg.

From Pythagoras’ theorem:

*x*2 + 17.52 = 18.52

*x*2 + 306.25 = 342.25

Subtract 306.25 from both sides.

*x*2 = 36

*x* = = 6

Each peg is 6 metres from the base of the flagpole.

**(b)** Each peg is 6 m from the base of the flagpole, so the distance between the pegs is 2 × 6 m = 12 m.

**(c)** Each wire is the hypotenuse of a right-angled triangle. Let *w* be the length of one of the wires. One shorter side is still formed by 17.5 m of the flagpole. The other shorter side is now only 4 m.

From Pythagoras’ theorem:

*w*2 = 17.52 + 42

*w*2 = 306.25 + 16

*w*2 = 322.25

*w* =

*w* ≈ 17.95 (2 d.p.)  
There are two wires, so the total length of wire needed is 2 × 17.95 = 35.90 m.

Question 18 6 marks [2.2, 2.4]

**(a)** The line from *A* goes north 4 squares: 4 × 100 m = 400 m

The next section of line is 11 squares long: 11 × 100 m = 1100 m. The direction is east.

The last section of the line is going north.

Erin walks 400 m north, then 1100 m east and then 200 m north.

**(b)** The total distance is 400 m + 1100 m + 200 m = 1700 m.

1700 m = 1.7 km

**(c)** The total distance north is 400 m + 200 m = 600 m.

The total distance east is 1100 m.

A straight line from *A* to *B* is the hypotenuse of a right-angled triangle with shorter sides of 600 m and 1100 m.

Let *s* m be the straight-line distance.

*s*2 = 6002 + 11002

*s*2 = 360 000 + 1 210 000

*s*2 = 1 570 000

*s* =

*s* ≈ 1253 (nearest whole number)

Erin would have to walk 1253 metres in a straight line from *A* to *B*.

Extended answer total marks: 16

TOTAL test marks: 46