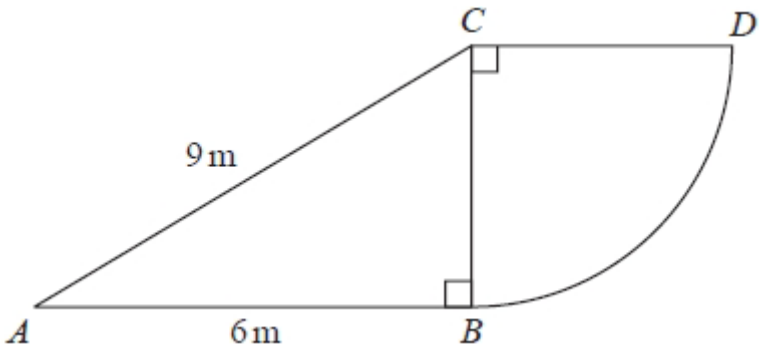
Questions

Q1.

The diagram shows a right-angled triangle and a quarter circle.



The right-angled triangle *ABC* has angle *ABC* = 90°
The quarter circle has centre *C* and radius *CB*.

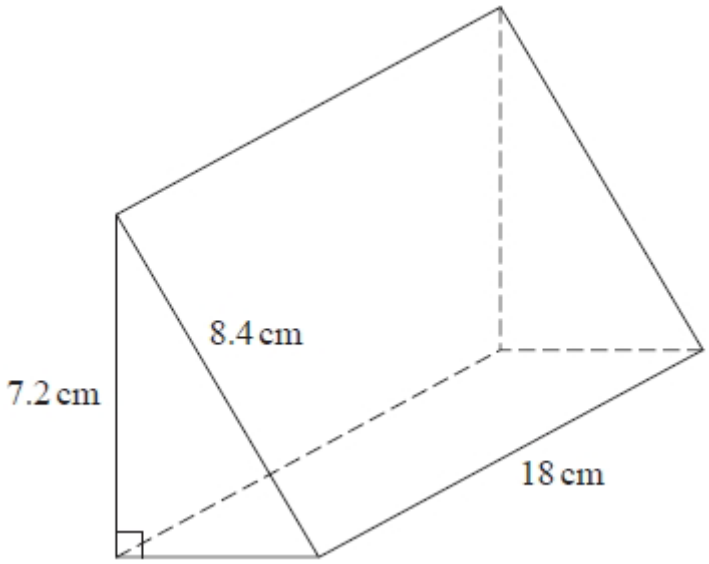
Work out the area of the quarter circle.
Give your answer correct to 3 significant figures.
You must show all your working.

..... m^2

(Total for question = 4 marks)

Q2.

Here is a triangular prism.



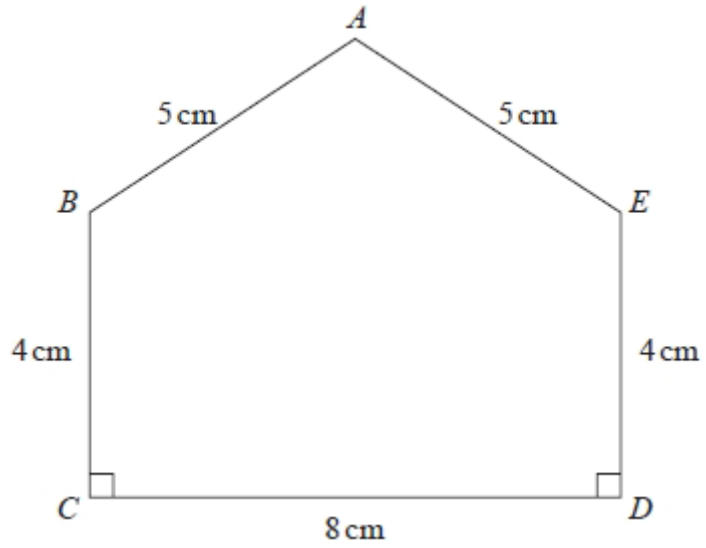
Work out the volume of the prism.
Give your answer correct to 3 significant figures.

..... cm^3

(Total for question = 5 marks)

Q3.

ABCDE is a pentagon.



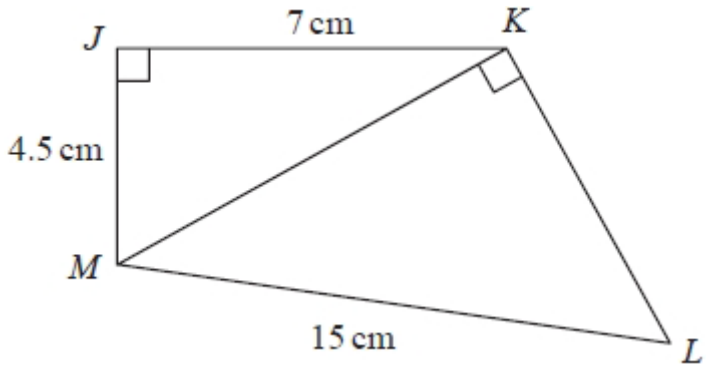
Work out the area of *ABCDE*.

..... cm^2

(Total for question = 5 marks)

Q4.

The diagram shows a quadrilateral *JKLM*.



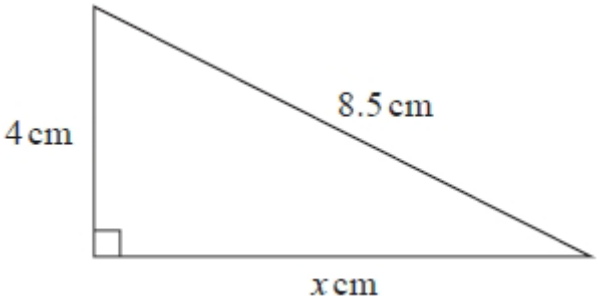
Work out the size of angle *KLM*.
Give your answer correct to 3 significant figures.

..... °

(Total for question = 4 marks)

Q5.

Here is a right-angled triangle.



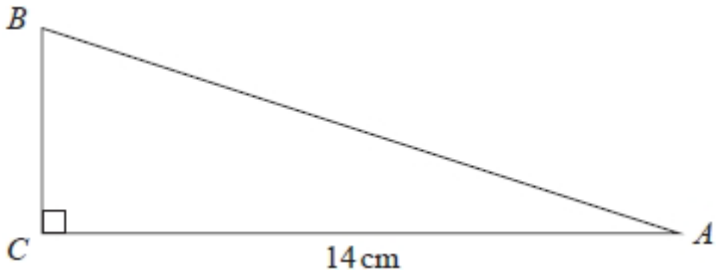
Work out the value of x.

x = ...

(Total for question = 2 marks)

Q6.

ABC is a right-angled triangle.



AC = 14 cm.
Angle *C* = 90°

size of angle *B* : size of angle *A* = 3 : 2

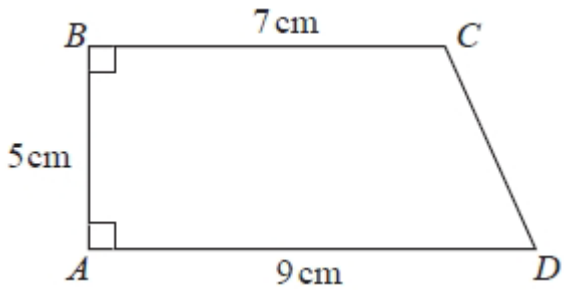
Work out the length of *AB*.
Give your answer correct to 3 significant figures.

..... cm

(Total for question = 4 marks)

Q7.

ABCD is a trapezium.



A square has the same perimeter as this trapezium.

Work out the area of the square.
Give your answer correct to 3 significant figures.

..... cm^2

(Total for question is 5 marks)

Q8.

The diagram shows a square *ABCD* inside a circle.

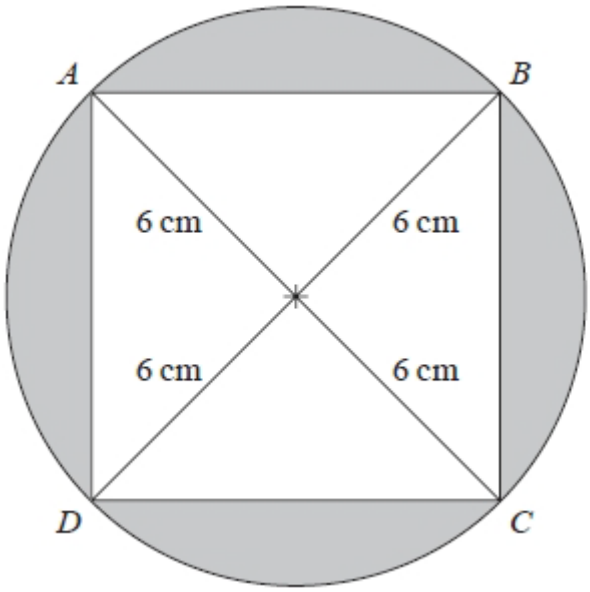


Diagram **NOT** accurately drawn

The points *A*, *B*, *C* and *D* lie on the circle.

The radius of the circle is 6 cm.

Work out the total area of the shaded regions.
Give your answer correct to 3 significant figures.

..... cm^2

(Total for question = 4 marks)

Q9.

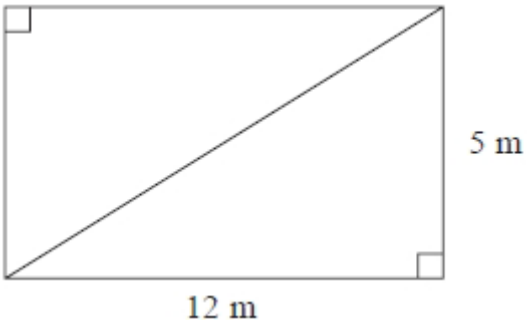
Triangle *ABC* has perimeter 20 cm. *AB* = 7 cm. *BC* = 4 cm.

By calculation, deduce whether triangle *ABC* is a right–angled triangle.

(Total for question = 4 marks)

Q10.

This rectangular frame is made from 5 straight pieces of metal.



The weight of the metal is 1.5 kg per metre.

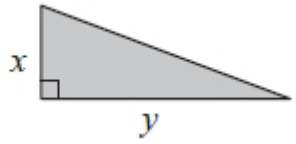
Work out the total weight of the metal in the frame.

..... kg

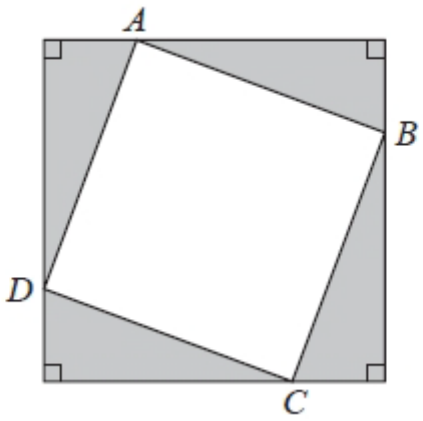
(Total for question = 5 marks)

Q11.

Here is a right–angled triangle.



Four of these triangles are joined to enclose the square *ABCD* as shown below.



Show that the area of the square *ABCD* is $x^2 + y^2$

(Total for question = 3 marks)

Q12.

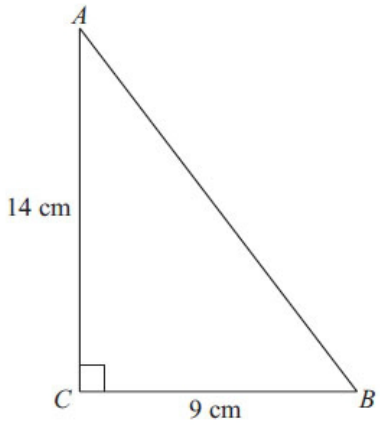


Diagram **NOT** accurately drawn

Calculate the length of *AB*.
Give your answer correct to 1 decimal place.

.....

(Total for Question is 3 marks)

Q13.
ABC is a right-angled triangle.

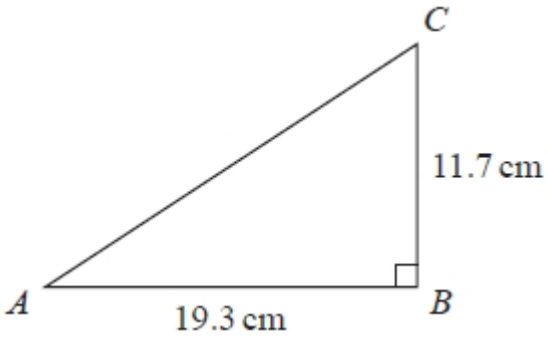


Diagram **NOT** accurately drawn

Calculate the length of *AC*.
Give your answer correct to 3 significant figures.

..... cm

(Total for question = 3 marks)

Q14.

GHJ is a right-angled triangle.

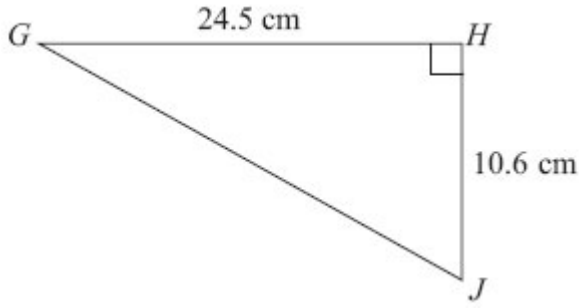


Diagram **NOT** accurately drawn

Calculate the length of *GJ*.
Give your answer correct to one decimal place.

.....

(Total for Question is 3 marks)

Q15.
Here is a right-angled triangle.

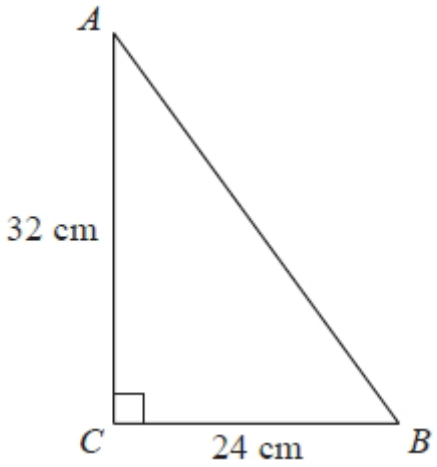
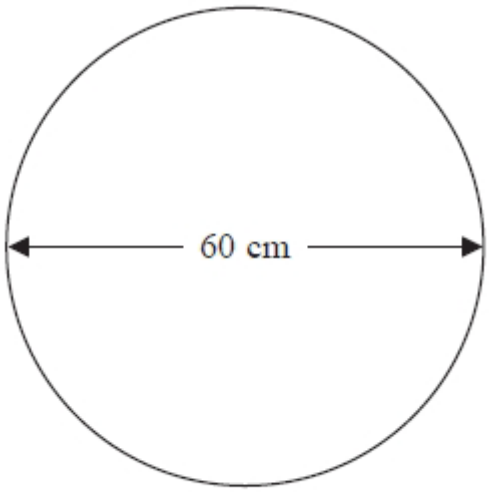


Diagram **NOT** accurately drawn

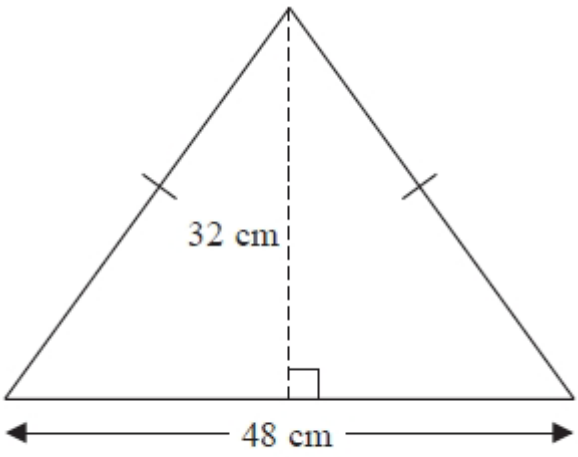
(a) Work out the length of *AB*.

..... cm
(3)

Inderpal is making two mirrors.



Mirror **A**



Mirror **B**

Diagram **NOT** accurately drawn

Mirror **A** is in the shape of a circle.
This mirror has a diameter of 60 cm.

Mirror **B** is in the shape of an isosceles triangle.
This mirror has base 48 cm and height 32 cm.

Inderpal buys metal strips to put around the edge of each mirror.
The metal strip is sold in lengths of one metre.
Each one metre length of metal strip costs £5.68

(b) Work out the total amount Inderpal pays.
You must show all your working.

£.....

(4)

(Total for Question is 7 marks)

Q16.

* Here is part of a field.

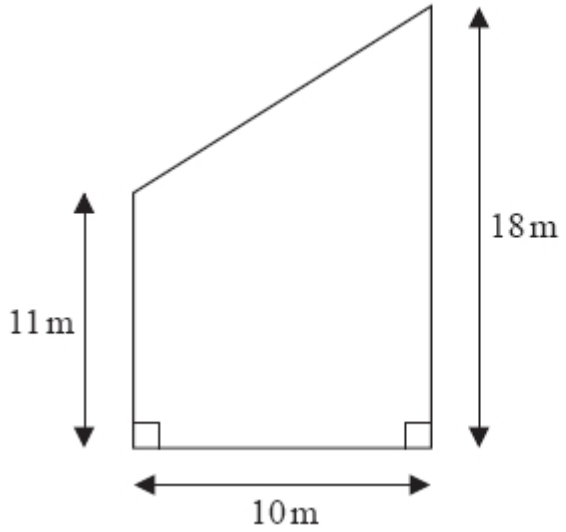


Diagram **NOT** accurately drawn

This part of the field is in the shape of a trapezium.
A farmer wants to put a fence all the way around the edge of this part of the field.

The farmer has 50m of fence.

Does he have enough fence?
You must show all your working.

(Total for question = 5 marks)

Q17.

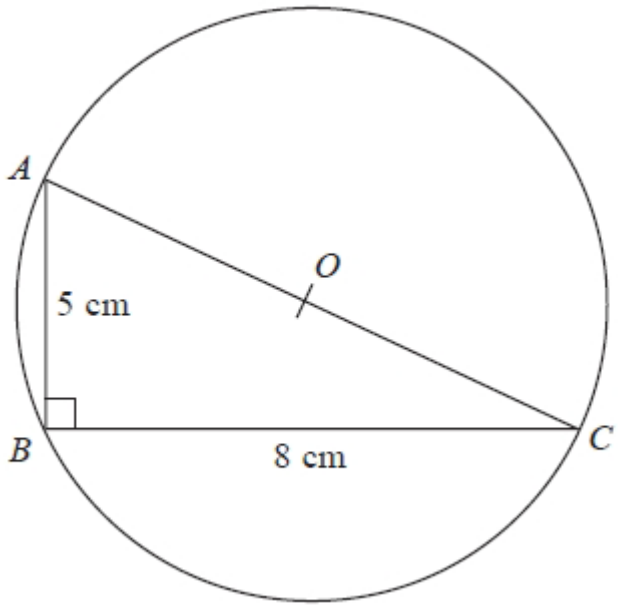


Diagram **NOT** accurately drawn

ABC is a right-angled triangle.
A, *B* and *C* are points on the circumference of a circle centre *O*.
AB = 5 cm
BC = 8 cm

AOC is a diameter of the circle.

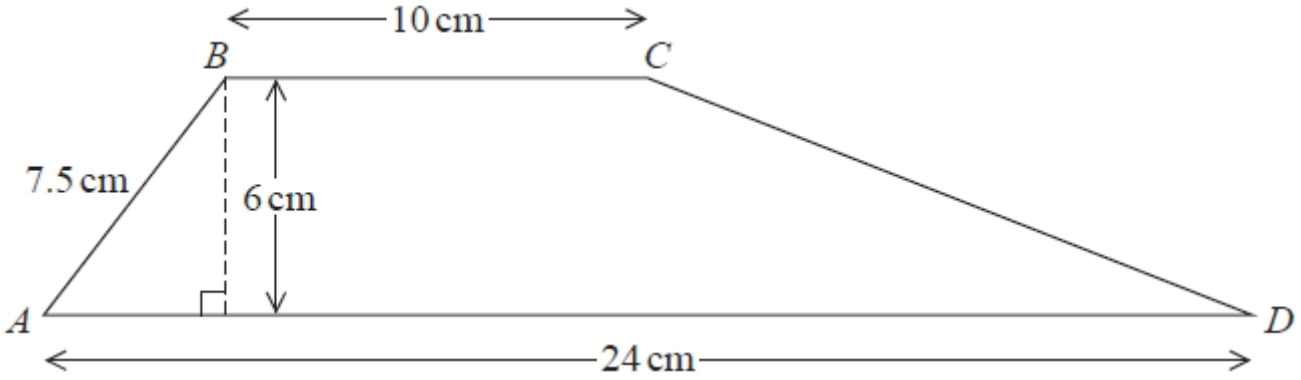
Calculate the circumference of the circle.
Give your answer correct to 3 significant figures.

..... cm

(Total for question = 4 marks)

Q18.

ABCD is a trapezium.



Work out the size of angle *CDA*.
Give your answer correct to 1 decimal place.

..... °

(Total for question = 5 marks)

Q19.

A frame is made from wire.

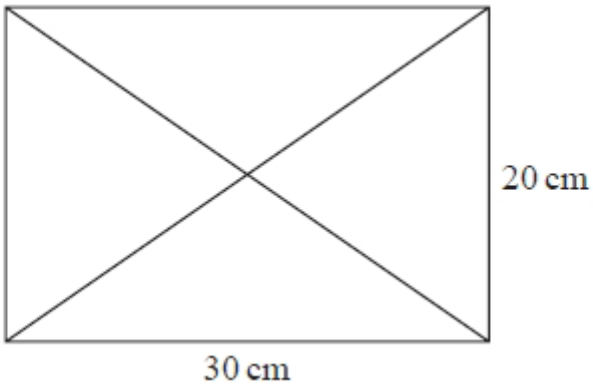


Diagram **NOT** accurately drawn

The frame is in the shape of a rectangle, 30 cm by 20 cm.
The two diagonals of the rectangle are also made from wire.

Calculate the total length of wire needed to make the frame and the diagonals.
Give your answer correct to 1 decimal place.

..... cm

(Total for question = 4 marks)

Examiner's Report

Q1.

This question combined the skills of using Pythagoras' Theorem and finding the area of a quarter circle and as such it was not well answered by foundation students. Some students realised that Pythagoras' Theorem had to be used but then often added the values squared rather than subtracting. Other students were able to indicate the intention to use the correct process to find the area of a quarter circle, these students were awarded a process mark. A very few students scored full marks on this question.

Q2.

This question was not well answered with many students just working with the dimensions given and calculating $7.2 \times 8.4 \times 18$, or sometimes going on to divide this value by 2.

Those students who recognised this question required the use of Pythagoras's Theorem had mixed success. Some students used $8.4^2 + 7.2^2$ but a good number of correct processes and values were seen.

Once the correct values were found students chose one of two options: some just found the volume of the cuboid using height, width and depth of the prism but others chose to find the area of the triangle, they then tended to go on to receive full marks for correctly using this to find the volume of the prism.

Q3.

No Examiner's Report available for this question

Q4.

No Examiner's Report available for this question

Q5.

Many did not recognise the need to use Pythagoras' theorem and therefore gained no credit. Some found the difference between the two sides given and produced an answer of 4.5 which attracted 0 marks. Some students wrote the difference of the squares the wrong way around, which gained no marks, unless they corrected this by giving the correct answer. A common incorrect method was for students to assume the perimeter was 20, and then subtract 8.5 and 4 to give an answer of 7.5, which could not be awarded any marks since it was from an incorrect method.

Q6.

This question proved to be a significant challenge to the vast majority of students. The only mark that was accessed with any regularity was the first mark for dealing with the ratio to find the missing angles. From that point on, only a very few students were able to correctly apply trigonometry to further their solution.

Q7.

No Examiner's Report available for this question

Q8.

For most the only mark gained was for correctly working out the area of the circle. But finding the area of the square was too difficult for nearly all students. Those using Pythagoras's Theorem were seen to round prematurely.

Q9.

No Examiner's Report available for this question

Q10.

Another problem solving question and again many students were able to gain some credit. The less able students tended to gain just one mark for multiplying lengths by 1.5. The more able realised the need to use Pythagoras's theorem and most who did, did so successfully. Although a good number were able to get full marks a large number of those who showed the correct processes were again let down by their arithmetic skills, or by failing to multiply the diagonal by 1.5.

Q11.
No Examiner's Report available for this question

Q12.
Candidates who realised that they had to use Pythagoras' theorem generally went on to give a fully correct method and final answer. Although the question advised candidates to give their answer to 1 decimal place, they were not penalised for incorrect rounding once an accurate answer had been seen. Students need to read calculator displays with care as many gave 227 as an interim answer rather than the correct 277. Use of the ANS key on a calculator would help prevent this error although students should always be encouraged to also write down full working. Occasionally candidates multiplied the side lengths 9 × 14 and, despite the diagram not accurately drawn warning, many had clearly measured the hypotenuse length to give 7.3 or 7.2 cm.

Q13.
This was either done correctly or completely wrong. Lots of combinations were seen, including squaring then subtracting, adding the sides (some halved 509 but gained one mark). Lots of students multiplied 19.3^2 and 11.7^2 or added and failed to square. A surprising number appeared to have no knowledge of Pythagoras' Theorem at all.

Q14.
Pythagoras' Theorem questions are also firm favourites on these papers and here again candidates did not score as well as they might have done. They made the usual mistakes of doubling instead of squaring, dividing by 2 instead of square rooting, adding the lengths instead of the squares of the lengths and even subtracting the squares of the given lengths. There was some evidence of candidates trying to use scale drawing but these were almost always unsuccessful as the required accuracy of the answer was too great for their drawing.

Q15.
Candidates understood they had to find the missing side *AB* in this right angled triangle but often just added the two sides of 32 and 24. Only about a third of candidates realised they had to square and add the lengths if the right angled triangle with many subtracting instead. In part (b) a lot of the candidates assumed they had to find the areas of the two mirrors rather than find the perimeter of the mirrors and so scored no marks. Very few candidates were able to give a fully correct solution to this question though partial credit was often earned for trying to find the circumference of the circle and the perimeter of the triangle. Those who did try to find the perimeter did not take account of the fact that the metal strip is sold in lengths of one metre when trying to find the cost. Most candidates did not associate part (a) with part (b).

Q16.
This proved to be a difficult question for Foundation tier students. Many of the students who realised that they needed to find the length of the sloping edge did not know how to do so and gained no marks. Those who did use Pythagoras' theorem were often able to find the length of the sloping edge and then go on to find the perimeter of the field. Some, however, included more than the four sides of the trapezium in their perimeter calculation. Area calculations were very common indeed with students comparing the area they had found with the 50m of fence available.

Q17.
Some students were able to use Pythagoras' Theorem to calculate the diameter of the circle. However few students were able to move beyond this point many used area instead of circumference. This question was not well answered by students at this level.

Q18.
Only the best students were able to work through to a correct solution, but part marks were awarded to those who attempted to do something of worth with the diagram. Some started with Pythagoras on the left hand right-angled triangle, but of course only earned marks if it was of the form $7.5^2 – 6^2$ (ie not added). It was not uncommon to find some attempting to find the area of the trapezium, which of course earned no marks. There was some (independent) credit for working with trigonometry. This could be done in the left-hand triangle (if the angle was made clear) or in the right-hand triangle (with their stated value for the base). But only a minority of students realised that trigonometry was needed.

Q19.

This proved to be a difficult question for Foundation tier students. Many students did not know how to work out the length of a diagonal and gained no marks. Area calculations were very common. Those who did use Pythagoras' theorem were usually able to find the length of a diagonal and then go on to find the total length of wire needed. Some, however, thought that the total length of wire needed comprised of just the two diagonals and failed to include the four sides of the rectangle. A common incorrect answer was 100 cm, the perimeter of the rectangle.

Mark Scheme

Q1.

Question	Answer	Mark	Mark scheme	Additional guidance
	35.3	P1	for starting the process to find length of third side of triangle, eg $9^2 - 6^2$ (=45) **or** $6^2 + x^2 = 9^2$	
		P1	for $\sqrt{9^2 - 6^2}$ or $\sqrt{81-36}$ or $\sqrt{45}$ or $3\sqrt{5}$ (= 6.7..) **or** $r^2 = 45$	
		P1	for stating or using $\pi \times$ [radius]$^2 \div 4$	[radius] is any value
		A1	for answer in range 35.2 to 35.4	If an answer in the range 35.2 to 35.4 is given in the working space then incorrectly rounded, award full marks No working, answer only no marks

Q2.

Question	Answer	Mark	Mark scheme	Additional guidance
	280	P1	for starting to use Pythagoras to find the missing side eg $8.4^2 - 7.2^2$ (= 18.72)	Award P1 for a correct Pythagorean statement eg $x^2+7.2^2=8.4^2$
		P1	for a complete process to find the missing side eg $\sqrt{70.56-51.84}$ **or** $\sqrt{18.72}$ (=4.32....)	4.3 truncated or rounded can imply P2
		P1	(dep P1) for a process to find the area of the triangular face eg [length of base] × 7.2) ÷ 2 (=15.57..) **OR** the volume of the cuboid eg [length of base] × 7.2 ×18 (=560.7..)	Uses a figure they show as the length of the base of the right angled triangle but dep on P1 Allow 15.57.. truncated or rounded if unsupported
		P1	for a complete process to find the volume of the prism eg "15.5.." × 18 **or** "560.7.." ÷ 2	
		A1	answer in the range 278 – 281	If an answer is given in the range 278 to 281 but then incorrectly given to 3 sig fig this mark can still be awarded.

Q3.

Question		Working	Answer	Mark	Notes
		$\sqrt{5^2-4^2}=3$ $4\times 8=32$ $32+\frac{1}{2}(3\times 8)$	44	5	P2 for $\sqrt{5^2-4^2}$ or for a height of 3 (P1 for 5^2-4^2) P1 for process to find one area P1 for a complete process to find the total area A1 cao

Q4.

Question	Working	Answer	Mark	Notes
		33.7	P1	for starting to use Pythagoras, e.g. 4.5^2+7^2
			P1	for complete process to find *KM*, e.g. $\sqrt{4.5^2+7^2}$ (= 8.321658489)
			P1	(dep P1) for a correct trigonometry statement, e.g. sin *KLM* = "8.32"…÷ 15
			A1	for answer in the range 33.6 to 33.7

Q5.

Question	Answer	Mark	Mark scheme	Additional guidance
	7.5	M1 A1	for correct use of Pythagoras, eg. 8.5^2-4^2 (= 56.25) or $4^2+x^2=8.5^2$ for 7.5 or $7\frac{1}{2}$ or $\frac{15}{2}$	Must have values substituted Trigonometry may be used but M1 only awarded when complete method shown.

Q6.

Question	Answer	Mark	Mark scheme	Additional guidance
	17.3	P1	for full process to find either angle eg $(180 - 90) \div (2+3) \times 2$ **or** for 36 or 54 seen as an angle	May be seen on diagram Condone correct values if incorrectly placed.
		P1	for a correct equation using trigonometry eg $\cos [A] = 14 \div AB$	This must be shown as an equation with all four elements (eg cos, $[A]$, 14, AB) present. $[A]$ could be 36 or any angle clearly and unambiguously identified as A. This also applies to $[B]$ with Sine.
		P1	(dep previous P mark) for rearranging their trigonometry equation to make AB the subject eg ($AB =$) "$14 \div \cos 36$"	
		A1	for an answer in the range 17.3 to 17.4	If an answer is shown in the range in working and then incorrectly rounded award full marks.

Q7.

Paper 1MA1: 2F			
Question	**Working**	**Answer**	**Notes**
		43.5	P1 For process to establish a right-angled triangle with two sides of 5 cm and 9 – 7 = 2 cm P1 For correct application of Pythagoras, eg. $5^2 + "2"^2$ P1 for a complete process to find perimeter, eg. 9 + 7 + 5 + "5.39" (= 26.385...) P1 for process to find area of square, eg. $(26.385... \div 4)^2$ A1 for answer in range 43.5 to 43.6

Q8.

PAPER: 1MA0/2F				
Question	**Working**	**Answer**	**Mark**	**Notes**
		41.1	4	M1 for method to work out the area of the circle or quarter circle or semi-circle eg $\pi \times 6^2$ (=113.(09..)) or $\pi \times 6^2 \div 2$ (=56.5(48..)) or $\pi \times 6^2 \div 4$ (= 28.2(7…)) M1 for method to work out the area of the square eg (=72) oe or a triangle eg ½×6×6 (=18) M1 for complete method to find shaded area. A1 for value in the range 41.04 - 41.112

Q9.

Question	Answer	Notes
	No with reasoning	M1 Derive AC=9 cm and identify as hypotenuse M1 $4^2 + 7^2$ A1 for using eg $AC = \sqrt{4^2 + 7^2}$ or 65 and 81 C1 for concluding explanation that ABC is not a right-angled triangle with evidence.

Q10.

Question	Working	Answer	Mark	Notes
		70.5	P1	starts process of Pythagoras e.g. $5^2 + 12^2$
			P1	complete process for Pythagoras e.g. $\sqrt{5^2+12^2}$ or $\sqrt{25+144}$ or $\sqrt{169}$ (=13)
			P1	(dep P1 for Pythagoras) process of adding all the lengths e.g. 5 + 5 + 12 + 12 + "13" (=47)
			P1	(indep) process of multiplying at least 2 lengths by 1.5
			A1	cao SC: any evidence of working with Pythagoras award the P1 or P2

Q11.

Question	Working	Answer	Notes
		complete chain of reasoning	C1 starts chain of reasoning eg finds area of large square and area of triangle or use of Pythagoras C1 for $(x + y)^2 - 4\times (x\times y\div 2)$ oe or $\sqrt{x^2 + y^2} \times \sqrt{x^2 + y^2}$ C1 complete chain of reasoning with correct algebra

Q12.

Question		Working	Answer	Mark	Notes
		$9^2 + 14^2 = 81 + 196 = 277$ $AB = \sqrt{277}$	16.6	3	M1 $9^2 + 14^2$ or 81 + 196 or 277 M1 $\sqrt{277}$ or $\sqrt{81+196}$ or A1 16.6 -16.643

Q13.

Question	Working	Answer	Mark	Notes
		22.6	3	M1 for $19.3^2 + 11.7^2$ or 372.49 + 136.89 or 509.38 M1 for $\sqrt{19.3^2 + 11.7^2}$ or $\sqrt{509.38}$ A1 for answer in range 22.5 to 22.6

Q14.

		Working	Answer	Mark	Notes
			26.7	3	M1 for $(GJ^2 =) 24.5^2 + 10.6^2$ or 600.25 + 112.36 or 712.61 M1 for $\sqrt{24.5^2 + 10.6^2}$ or $\sqrt{712.61}$ A1 26.69 – 26.7

Q15.

PAPER: 1MA0_2F					
Question		Working	Answer	Mark	Notes
	(a)		40	3	M1 for $32^2 + 24^2$ M1 for $\sqrt{1600}$ or $\sqrt{(32^2 + 24^2)}$ A1 cao
	(b)		22.72	4	M1 for use of $\pi \times 60$ oe M1 for method to calculate perimeter of triangle, eg 2 × '40' + 48 (=128) M1(dep M2) for complete method to find total length of strip for both mirrors or to find the cost of strip for one mirror, eg 2 × £5.68 A1 for £22.72 from correct working

Q16.

Question		Working	Answer	Mark	Notes
*			No not enough	5	M1 for substituting into Pythagoras' theorem M1 for complete correct use of Pythagoras' theorem M1 for a complete method to find the perimeter of the trapezium A1 51.(20655..) C1 (dep on first two Ms) for correct conclusion dependent upon supporting calculations

Q17.

5MB3F/01 June 2015				
Question	**Working**	**Answer**	**Mark**	**Notes**
		29.6	4	M1 for $8^2 + 5^2$ or $64 + 25$ or 89 M1 (dep) $\sqrt{"8^2" + "5^2"}$ (= 9.4..) M1 for "9.4.." × π A1 for 29.5 – 29.65

Q18.

Question	**Working**	**Answer**	**Mark**	**Notes**
		32.3	P1	for using Pythagoras to find length of third side of triangle, eg $7.5^2 - 6^2$ or $6^2 + x^2 = 7.5^2$ or uses trigonometry to find angle in triangle eg $\sin A = \frac{6}{7.5}$ or $\cos B = \frac{6}{7.5}$
			P1	(dep P1) for complete process to find length of third side of triangle eg $\sqrt{7.5^2 - 6^2}$ or $\sqrt{56.25 - 36}$ or $\sqrt{20.25}$ (=4.5) or uses trigonometry to find base length of triangle eg 7.5 × cos "A" or 7.5 × sin "B" or $\frac{6}{\tan"A"}$
			P1	(dep P2) for 24 – 10 – "4.5" (= 9.5)
			P1	(indep) for process to find angle CDA, eg $\tan CDA = \frac{6}{base}$ from right-angled triangle
			A1	for answer in the range 32.2 to 32.3

Q19.

PAPER: 1MA0_2F				
Question	**Working**	**Answer**	**Mark**	**Notes**
		172.1	4	M1 for $30^2 + 20^2$ or 900 + 400 or 1300 M1 for $\sqrt{30^2 + 20^2}$ or $\sqrt{1300}$ (= 36(.0555)) M1 for a complete method to find the length of wire required e.g. 2×'36.1' + 2×30 + 2×20 A1 172 – 172.2