Foundation Area Questions

Q1.

Here is a rectangle.

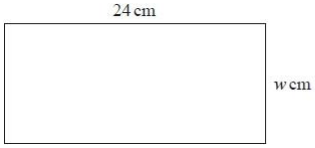


Diagram **NOT** accurately drawn

The area of the rectangle is 432 cm^2

Work out the value of *w*.

w = ...

(Total for question = 2 marks)

Q2.

The length of a rectangle is 12 cm.
The width of the rectangle is 7 cm.
Work out the area of the rectangle.

.....cm^2

(Total for question = 2 marks)

Q3.

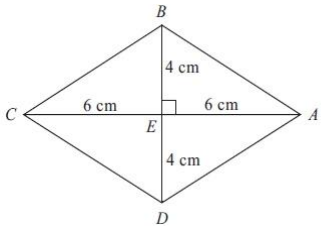


Diagram **NOT** accurately drawn

ABCD is a rhombus.
The diagonals *AC* and *BD* cross at the point *E*.
AE = *CE* = 6 cm.
BE = *DE* = 4 cm.
Angle *AEB* = 90°
(a) Work out the area of the rhombus.

.....cm^2
(3)

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

..... cm
(3)

(Total for question is 3 marks)

Q4.

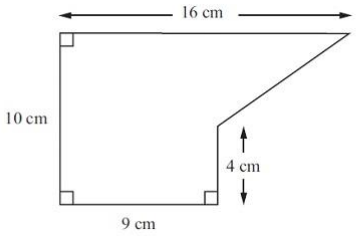


Diagram **NOT** accurately drawn

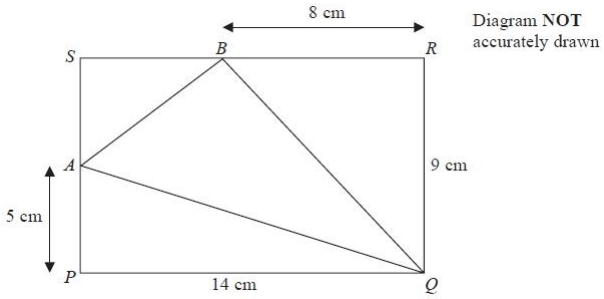
The diagram shows a shape.
Work out the area of the shape.

..... cm^2

(Total for question = 2 marks)

Q5.

The diagram shows a rectangle *PQRS*.
PQ = 14 cm and *QR* = 9 cm.
The point *A* lies on *PS* so that *PA* = 5 cm.
The point *B* lies on *SR* so that *BR* = 8 cm.



(a) Work out the area of triangle *AQB*.

..... cm^2

(4)

(b) Work out the length of *AQ*.
Give your answer correct to 3 significant figures.

..... cm

(3)

(Total for Question is 7 marks)

Q6.

The diagram shows a square and a circle.

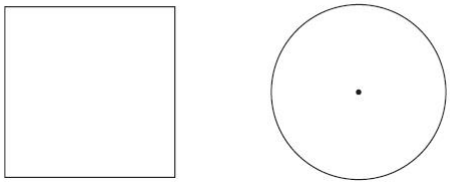


Diagram **NOT** accurately drawn

The square has area 400 cm^2

The diameter of the circle is equal to the length of a side of the square.

Work out the circumference of the circle.
Give your answer correct to 1 decimal place.

..... cm

(Total for question = 3 marks)

Q7.

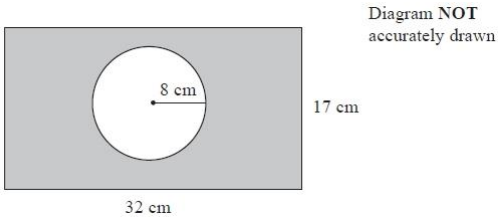


Diagram **NOT** accurately drawn

The diagram shows a circle inside a rectangle.

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

..... cm^2

(Total for question = 3 marks)

Q8.

Here are two circles.

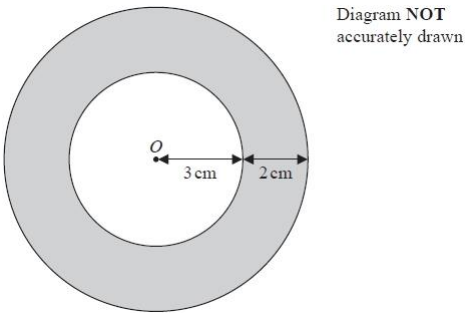


Diagram **NOT** accurately drawn

The circles have the same centre *O*.
The radius of the inner circle is 3 cm.
The width of the shaded region between the inner circle and outer circle is 2 cm.

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

.... cm^2

(Total for question = 3 marks)

Q9.

The diagram shows a shape with one line of symmetry.

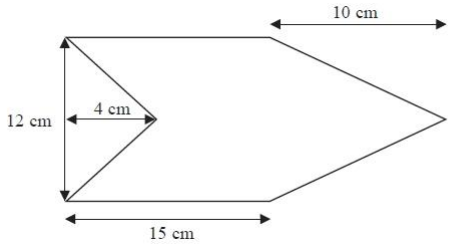


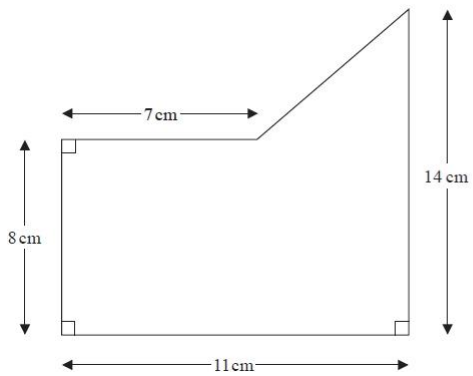
Diagram **NOT** accurately drawn

Work out the area of the shape.

.....cm^2

(Total for question = 4 marks)

Q10.



Work out the area of this shape.

.....cm^2

(Total for question = 4 marks)

Q11.

A square hole is cut from a circular piece of card.

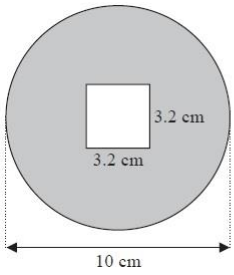


Diagram **NOT** accurately drawn

The square has sides of length 3.2 cm.

The diameter of the circular piece of card is 10 cm.

Work out the area of the shaded region.

Give your answer correct to 3 significant figures.

..... cm^2

(Total for Question is 4 marks)

Mark Scheme

Q1.

Question	Working	Answer	Mark	Notes
	$24 \times w = 432$	18	2	M1 or $432 \div 24$ A1

Q2.

Question Number	Working	Answer	Mark	Notes
	12 × 7		2	M1
		84		A1 cao
				Total 2 marks

Q3.

Question	Working	Answer	Mark	Notes	
(a)	Complete, correct expression which, if correctly evaluated, gives 48 eg $4\times\frac{1}{2}\times6\times4$, $2\times\frac{1}{2}\times12\times4$, $\frac{1}{2}\times12\times8$		3	M2	M1 for correct expression for area of one relevant triangle $\frac{1}{2}\times6\times4$, $\frac{1}{2}\times8\times6$ or $\frac{1}{2}\times12\times4$
		48		A1	cao
(b)	4^2+6^2 = 16 + 36 = 52		3	M1	for squaring and adding
	$\sqrt{4^2+6^2}$			M1	(dep) for square root
		7.21		A1	for answer which rounds to 7.21 (7.211102...)
					Total 6 marks

Q4.

Q	Working	Answer	Mark	Notes	
	Splits shape appropriately eg rectangle + triangle or rectangle + trapezium or 'completing the rectangle'		4	B1	If lines not present on diagram then can be implied by correct method for at least two areas (areas must not overlap and must not be contradictory)
	eg. 9 × 10 or 90 or 9 × 4 or 36 or 9×6 or 54 or $\frac{1}{2}\times7\times6$ or 21 or $\frac{1}{2}\times(16+9)\times6$ or 75 16 × 10 or 160 or $\frac{1}{2}\times(4+10)\times7$ or 49			M1	for area of one appropriate rectangle, triangle or trapezium
	eg. $\frac{1}{2}\times7\times6+9\times10$ $\frac{1}{2}\times7\times6+9\times4+9\times6$ $9\times4+\frac{1}{2}\times(16+9)\times6$ $16\times10-\frac{1}{2}\times(4+10)\times7$			M1	for complete method
		111		A1	cao
					Total 4 marks

Q5.

Question	Working	Answer	Mark	Notes
(a)	$\frac{1}{2}\times 8\times 9$ or $\frac{1}{2}\times 5\times 14$ or 36 or 35		4	M1 Correct expression for area of *RQB* or *PQA*.
	$\frac{1}{2}\times 4\times 6$ or 12			M1 Correct expression for area of *ABS*.
	$9\times 14-\frac{1}{2}\times 4\times 6-\frac{1}{2}\times 8\times 9-\frac{1}{2}\times 5\times 14$ or $126-12-36-35$			M1 Area of rectangle – their three triangles
		43		A1
	Alternative:			
	$AB=\sqrt{52},\ BQ=\sqrt{145}$, AQ $=\sqrt{221}$		4	M1 A correct method to find all 3 sides of triangle ABQ
	ABQ = 97.9434… or BQA = 28.7126… or BAQ = 53.3438…			M1 A correct method to find an angle in ABQ (cosine rule or 180 — use of trig in 2 smaller triangles)
	$\frac{1}{2}(\sqrt{52})(\sqrt{145})\sin(97.9..)$ or $\frac{1}{2}(\sqrt{145})(\sqrt{221})\sin(28.7..)$ or $\frac{1}{2}(\sqrt{52})(\sqrt{221})\sin(53.3..)$ oe			M1 Correct use of formula $\frac{1}{2}ab\sin C$ to find area of ABQ
		43		A1 Must be exact answer – not from rounding.
	Alternative:			
			4	M2 For a correct method to find 2 sides and the correct included angle (by use of trig and angles on a straight line).
				M1 Correct use of formula $\frac{1}{2}ab\sin C$ to find area of ABQ (see above)
		43		A1 Must be exact answer – not from rounding.
(b)	5^2+14^2 or 25 + 196 or 221		3	M1 For squaring and adding
	$\sqrt{5^2+14^2}$ or $\sqrt{25+196}$ or $\sqrt{221}$			M1 dep for square root
		14.9		A1 For answer rounding to 14.9
				Total 7 marks

Q6.

Question	Working	Answer	Mark	Notes
	$\sqrt{400}=20$ $\pi\times$ '20' oe	62.8	3	M1 M1 dep A1 62.83185 ... Accept awrt 62.8

Q7.

Q	Working	Answer	Mark	Notes
	32×17 or 544 or $\pi\times 8^2$ oe or 200.9 – 201.602		3	M1
	$32\times 17-\pi\times 8^2$			M1 for the complete, correct method
		343		A1 for awrt 343
				Total 3 marks

Q8.

Ques		Working	Answer	Mark	Notes
		$\pi\times 3^2(=9\pi=28.(27..))$ or $\pi\times(3+2)^2$ $(=25\pi=78.(53..))$		3	M1 A correct calculation for the area of one of the circles
		$\pi\times 5^2-\pi\times 3^2$ oe eg 16π			M1 A correct calculation for the shaded area
			50.3		A1 50.2 – 50.3
					Total 3 marks

Q9.

Question	Working	Answer	Mark	Notes
	eg $15\times12+\frac{1}{2}\times12\times10-\frac{1}{2}\times12\times4$ or $180+60-24$ or $(10+15)\times12-(\frac{1}{2}\times12\times4+\frac{1}{2}\times10\times6+\frac{1}{2}\times10\times6)$ or $300-(24+30+30)$ or $2\times\frac{1}{2}(15+21)\times6$ or 2×108			M3 For a complete method.
	eg $\frac{1}{2}\times4\times12$ and $\frac{1}{2}\times10\times6$ (24 and 30) or $\frac{1}{2}\times4\times12$ and $\frac{1}{2}\times10\times12$ (24 and 60) or $\frac{1}{2}\times4\times6$ and $\frac{1}{2}\times10\times6$ (12 and 30) or $\frac{1}{2}\times4\times6$ and $\frac{1}{2}\times10\times12$ (12 and 60) or $\frac{1}{2}(15+21)\times6$ or 108 or $\frac{1}{2}(15+11)\times6$ or 78			If not M3 then M2 for 2 different but non overlapping triangles or 1 trapezium
	eg $\frac{1}{2}\times4\times6$ or 12 or $\frac{1}{2}\times4\times12$ or 24 or $\frac{1}{2}\times10\times6$ or 30 or $\frac{1}{2}\times10\times12$ or 60 or $\frac{1}{2}\times11\times6$ or 33 or $\frac{1}{2}\times11\times12$ or 66 or $\frac{1}{2}\times15\times6$ or 45 or 15×6 or 90 or 15×12 or 180 or 25×6 or 150 or 25×12 or 300 or 10×6 or 60 or 10×12 or 120 or 11×6 or 66 or 11×12 or 132 or 4×12 or 48 or 4×6 or 24		4	If not M2 then M1 for a correct area of a triangle or rectangle. NB : The lists of examples are not exhaustive.
		216		A1
				Total 4 marks

Q10.

Question	Working	Answer	Mark	Notes
	Splits shape appropriately eg rectangle + triangle or rectangle + trapezium or 'completing the rectangle'		4	B1 If lines not present on diagram then can be implied by correct method for at least 2 areas (areas must not overlap or be contradictory)
	eg. 8×11 or 88 or $0.5\times4\times6$ or 12 or 8×7 or 56 or $\frac{4}{2}\times(8+14)$ or 44 or 11×14 or 154 or $\frac{6}{2}\times(7+11)$ or 54			M1 for area of one rectangle, triangle or trapezium from the diagram
	eg. $8\times11+0.5\times4\times6$ (=88+12) or $8\times7+\frac{4}{2}\times(8+14)$ (=56+44) or 11×14 or $154-\frac{6}{2}\times(7+11)$ (=154−54)			M1 for complete method
		100		A1
				Total 4 marks

Q11.

Question	Working	Answer	Mark	Notes
	3.2×3.2 (= 10.24) $\pi\times5^2$ (= 78.5....) { π = 3.14 or better} $\pi\times5^2-3.2\times3.2$	68.3	4	M1 Area of square. M1 Area of circle, accept awrt 78.5 →78.6 incl. M1 Intention to subtract areas from correct methods. A1 Accept awrt 68.3 or 68.4
				Total 4 marks