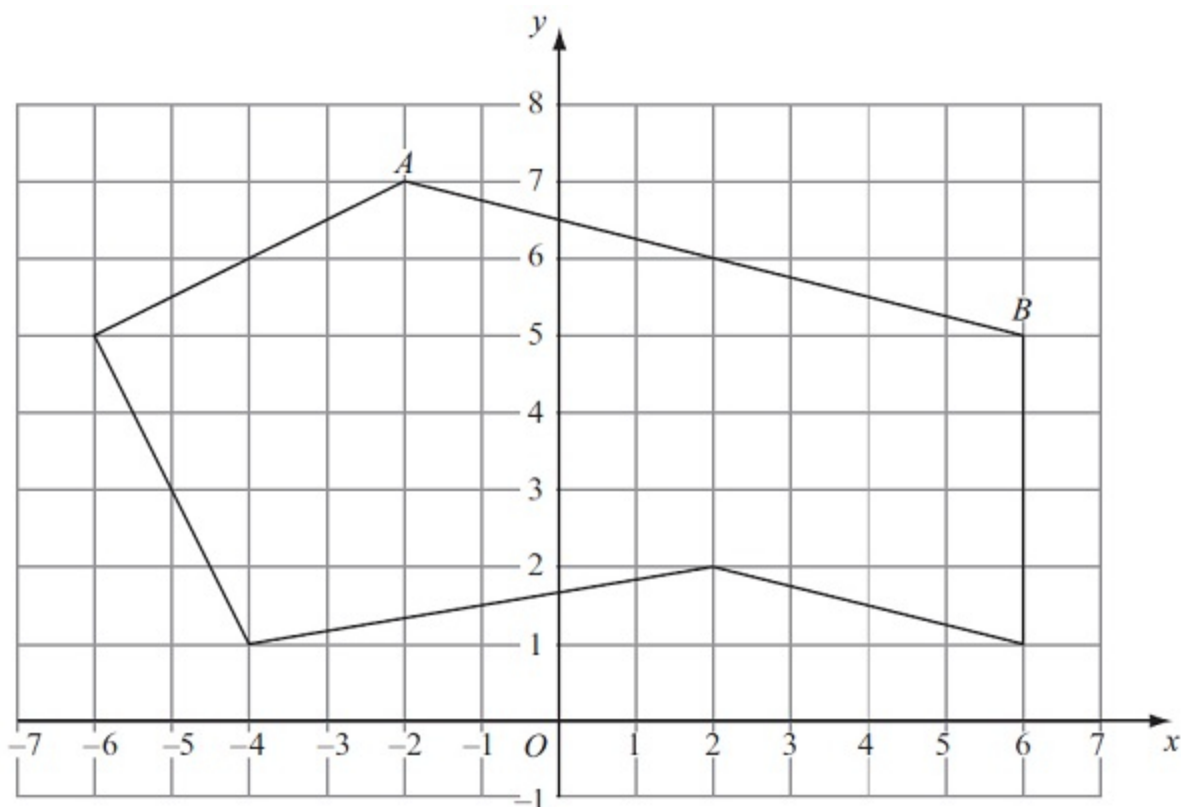




Unit 1 Revision Sheet D Shape and Space Foundation & Higher Questions

Q1.

A 6-sided polygon is shown on a grid.



(a) Write down the mathematical name for a 6-sided polygon.

.....
(1)

(b) On the polygon, mark with arrows ($>$) a pair of parallel lines.

(1)

(c) On the polygon, mark with crosses (\times) a pair of perpendicular lines.

(1)

(d) Write down the coordinates of the point A.

(.....,)
(1)

(e) Find the coordinates of the midpoint of AB .

(.....,)
(2)

(Total for question = 6 marks)



Q2.

The diagram shows a triangle.

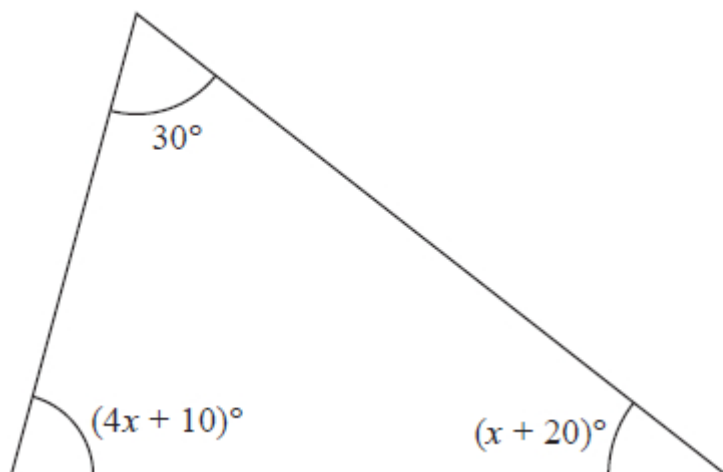


Diagram **NOT**
accurately drawn

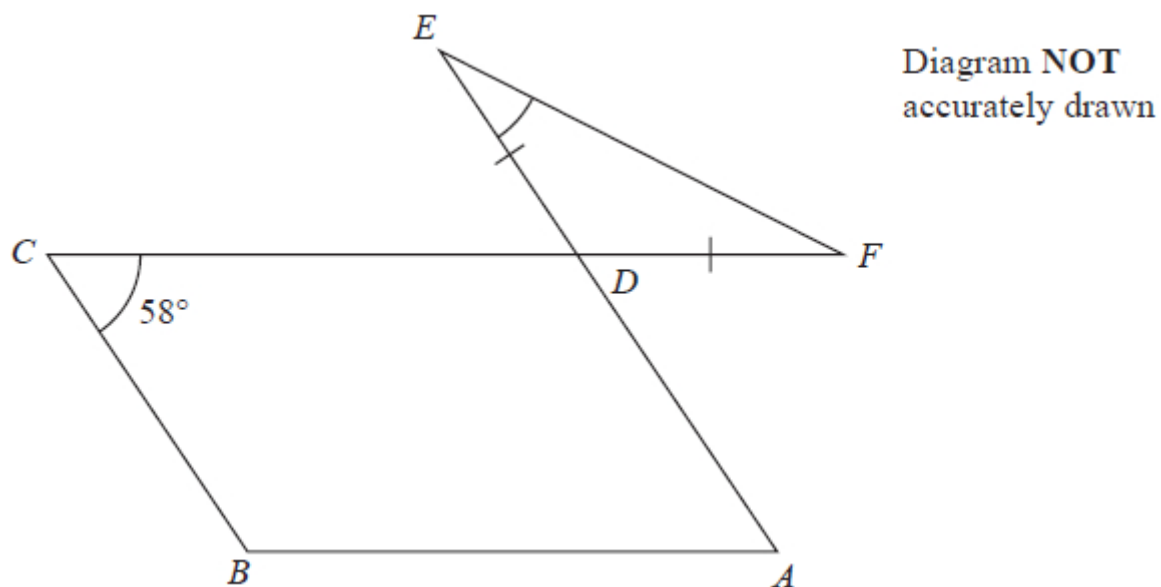
Work out the value of x .

$x = \dots\dots\dots$

(Total for question = 4 marks)



Q3.



The diagram shows a parallelogram $ABCD$ and an isosceles triangle DEF in which $DE = DF$

CDF and ADE are straight lines.

Angle $BCD = 58^\circ$

Work out the size of angle DEF .

Give a reason for each stage of your working.

..... %

(Total for question = 5 marks)



Q4.

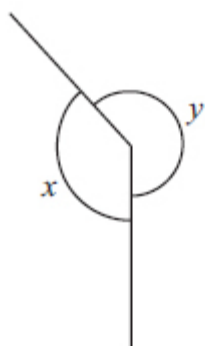


Diagram NOT
accurately drawn

(a) Explain why the diagram is wrong for $x = 135^\circ$ and $y = 245^\circ$

.....
.....

(2)

(b) Write down the mathematical name for

(i) an angle of 135°

(ii) an angle of 245°

.....
.....

(2)

(Total for question is 4 marks)

Q5.

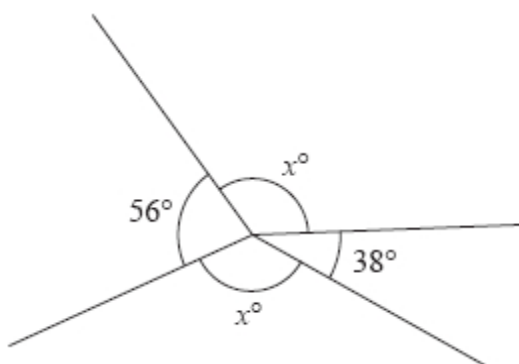


Diagram NOT
accurately drawn

Work out the value of x .

.....

(Total for question = 3 marks)



Q6.

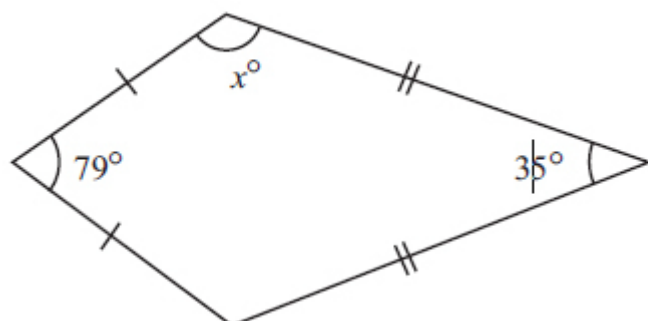


Diagram NOT
accurately drawn

The diagram shows a kite.
Work out the value of x .

$x = \dots\dots\dots$

(Total for question = 3 marks)

Q7.

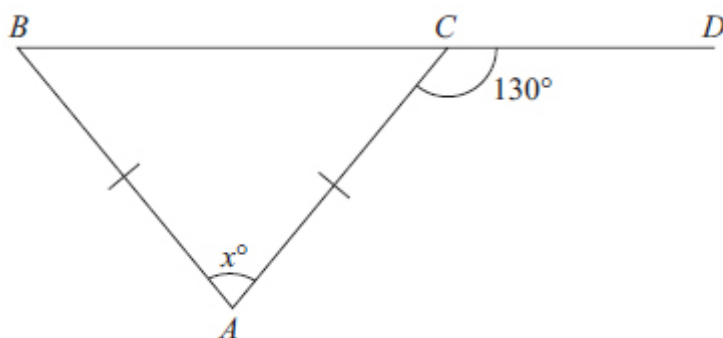


Diagram NOT
accurately drawn

The diagram shows an isosceles triangle ABC .
 $AB = AC$.
 BCD is a straight line.
Angle $ACD = 130^\circ$
Work out the value of x .

$x = \dots\dots\dots$

(Total for question = 3 marks)



Q8.

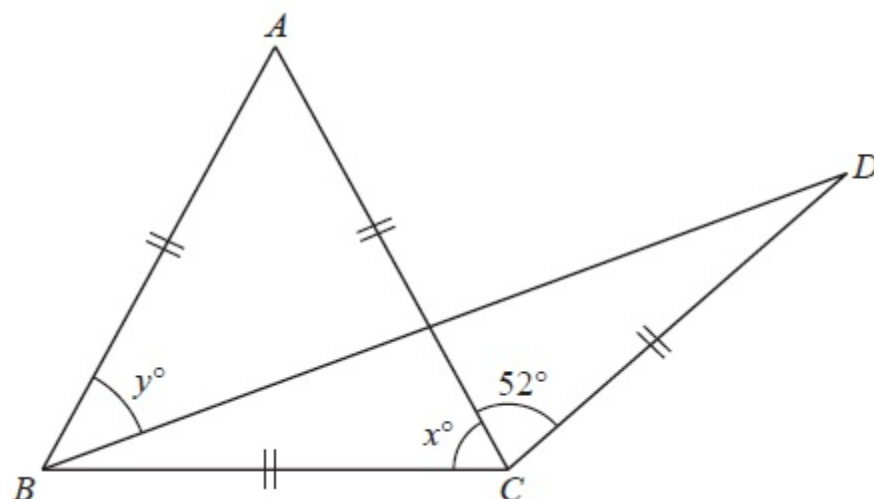


Diagram NOT
accurately drawn

The diagram shows an equilateral triangle ABC and an isosceles triangle BCD .

$$AB = AC = BC = CD.$$

$$\text{Angle } ACD = 52^\circ$$

$$\text{Angle } ACB = x^\circ$$

(i) Find the value of x .

$$x = \dots\dots\dots$$

$$\text{Angle } ABD = y^\circ$$

(ii) Work out the value of y .

$$y = \dots\dots\dots$$

(Total for Question is 4 marks)

Q9.

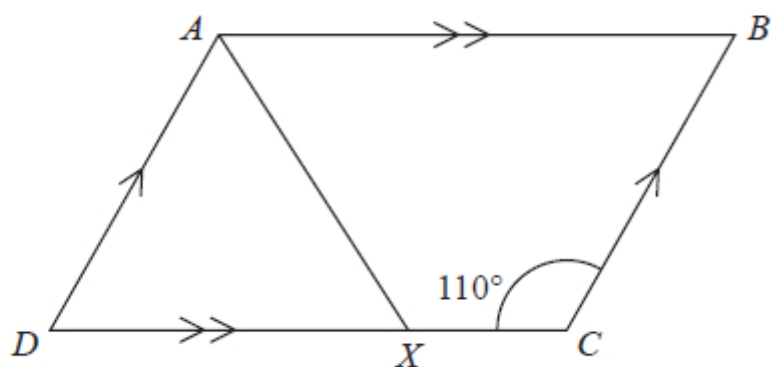


Diagram **NOT**
accurately drawn

$ABCD$ is a parallelogram.

Angle $DCB = 110^\circ$

X is the point on DC such that AX bisects the angle DAB .

Calculate the size of angle AXC .

.....°

(Total for question = 4 marks)



Q10.

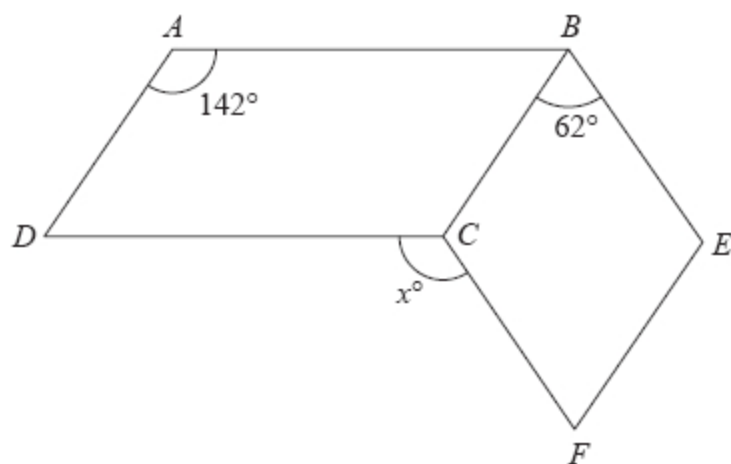


Diagram **NOT**
accurately drawn

$ABCD$ is a parallelogram.
 $BEFC$ is a rhombus.

Angle $DAB = 142^\circ$
Angle $CBE = 62^\circ$

Calculate the value of x .

$x = \dots\dots\dots$

(Total for question = 3 marks)



Q11.

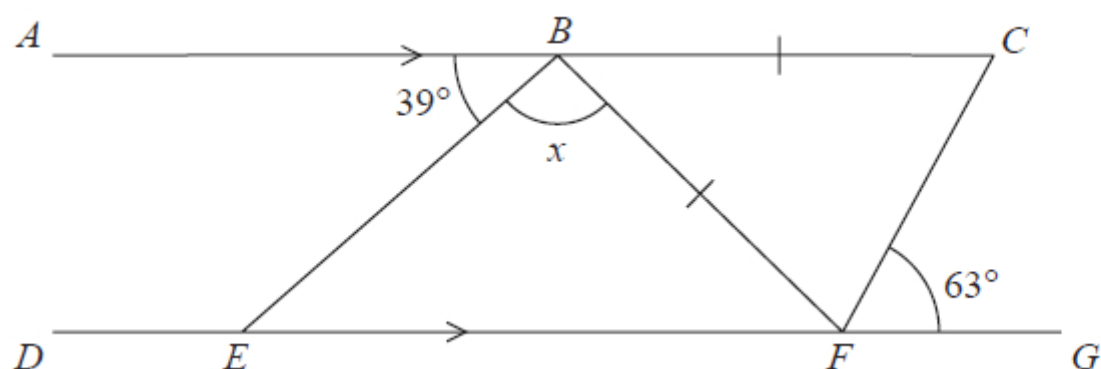


Diagram **NOT**
accurately drawn

ABC is parallel to $DEFG$

$BC = BF$

Angle $ABE = 39^\circ$

Angle $CFG = 63^\circ$

Work out the size of angle x .

Give a reason for each stage in your working.

.....°

(Total for question = 5 marks)

Q12.



The diagram shows the plan of Sophia's gym floor.

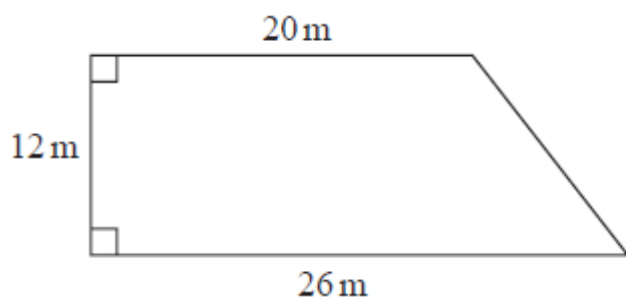


Diagram **NOT**
accurately drawn

Sophia is going to paint all the gym floor.

Each tin of paint she is going to use covers an area of 20 m^2

There is a special offer on the paint that Sophia is going to buy.

<u>Special Offer</u>	
1 tin for \$13	
4 tins for \$40	

Work out the least amount of money that Sophia has to pay in order to buy all the paint she needs.
Show your working clearly.

..... \$

(Total for question = 5 marks)



The diagram shows a shaded shape $ABCD$ made from a semicircle ABC and a right-angled triangle ACD .

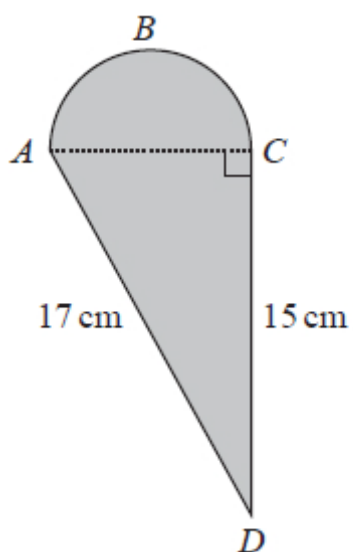


Diagram **NOT**
accurately drawn

AC is the diameter of the semicircle ABC .

Work out the perimeter of the shaded shape.
Give your answer correct to 3 significant figures.

..... cm

(Total for question = 5 marks)



Q14.

The diagram shows an isosceles triangle.

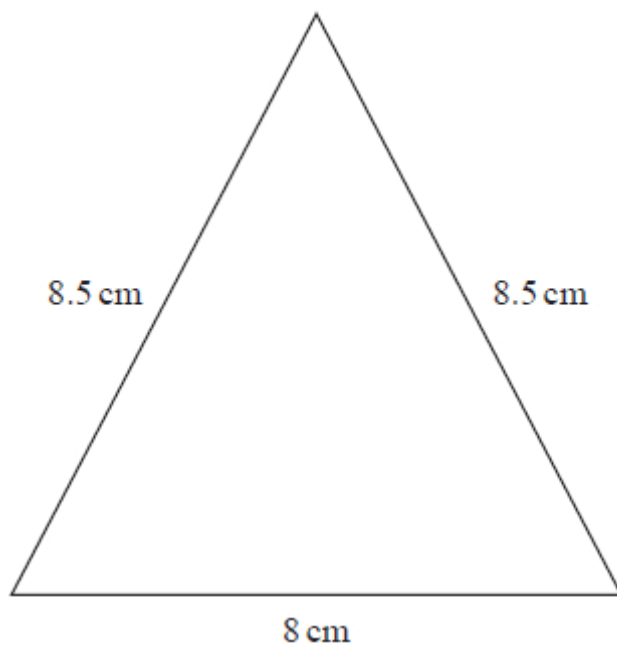


Diagram NOT
accurately drawn

Work out the area of the triangle.

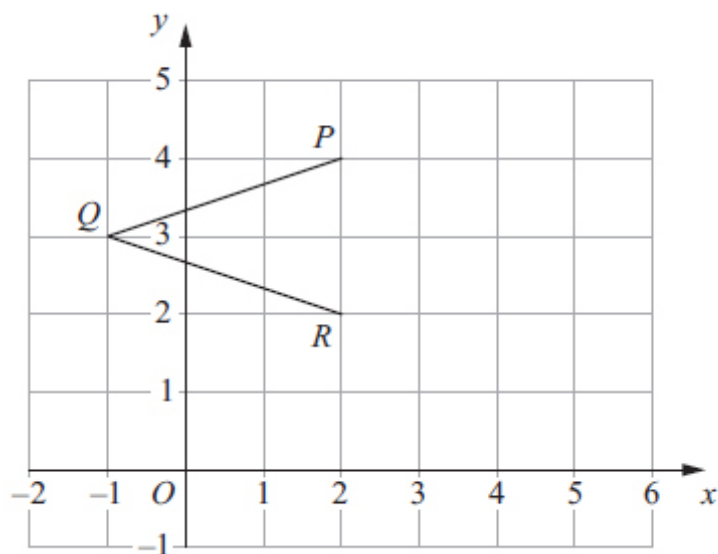
..... cm^2

(Total for question = 4 marks)

Q15.



The diagram shows three points P , Q and R on a 1 cm grid.



(a) Write down the coordinates of P .

(.....,)
(1)

(b) Write down the coordinates of Q .

(.....,)
(1)

(c) On the grid, mark the point S so that $PQRS$ is a rhombus.

(1)

(d) Work out the area of the rhombus $PQRS$.

..... cm^2
(2)

(e) Write down the equation of the line PR .

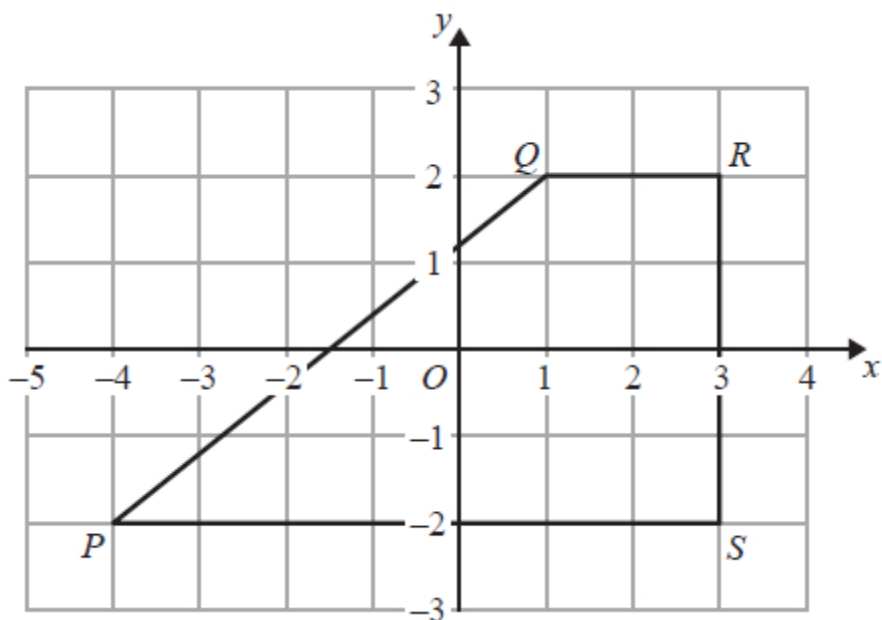
.....
(1)

(Total for question = 6 marks)



Q16.

The diagram shows a quadrilateral $PQRS$ on a centimetre grid.



(a) Write down the coordinates of R .

(..... ,)
(1)

(b) Write down the coordinates of P .

(..... ,)
(1)

(c) What is the mathematical name of the quadrilateral $PQRS$?

.....
(1)



- (d) Measure the length of the side PQ .
Give your answer in centimetres to 1 decimal place.

..... cm
(1)

- (e) Find the perimeter of the quadrilateral $PQRS$.
Give your answer in centimetres to 1 decimal place.

..... cm
(2)

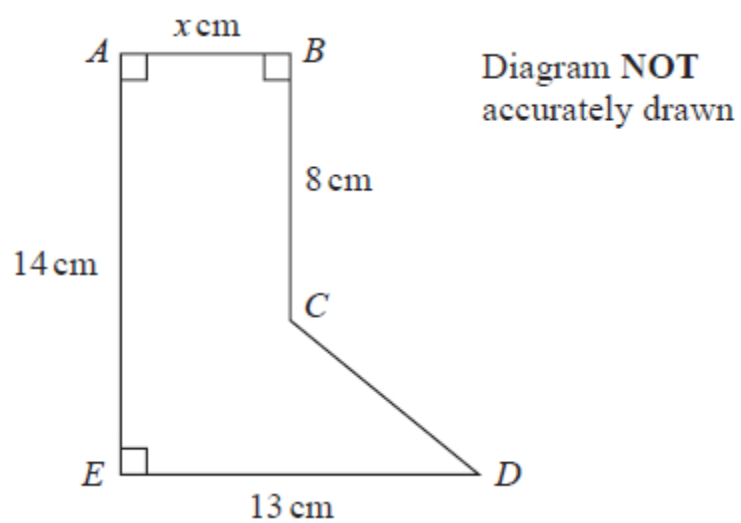
- (f) Work out the area of the quadrilateral $PQRS$.

..... cm^2
(2)

(Total for question = 8 marks)



Q17.



The diagram shows the shape $ABCDE$.

The area of the shape is 91.8 cm^2

Work out the value of x

$x = \dots\dots\dots$

(Total for question = 4 marks)



Q18.

A circle has radius 9 cm.

(a) Work out the circumference of the circle.

Give your answer correct to 1 decimal place.

cm

(2)

The diagram shows the pentagon $ABCDE$.

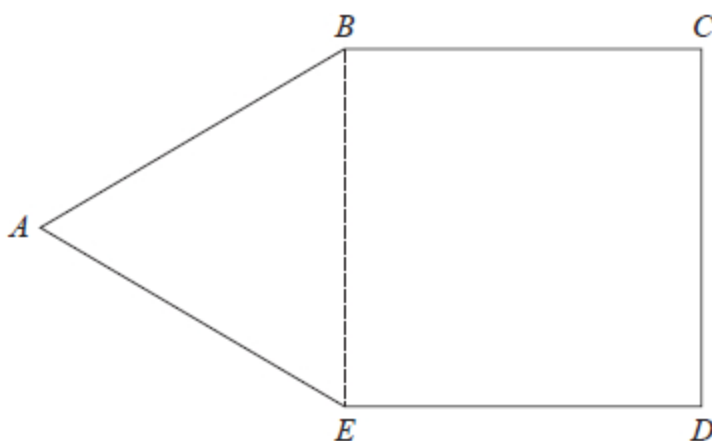


Diagram NOT
accurately drawn

ABE is an equilateral triangle.

$BCDE$ is a square with area 169 cm^2

(b) Work out the perimeter of $ABCDE$.

cm

(3)

(Total for question = 5 marks)



Q19.

A circle has radius 7.5 cm

Work out the area of the circle.

Give your answer correct to 3 significant figures.

..... cm²

(Total for question = 2 marks)

Q20.

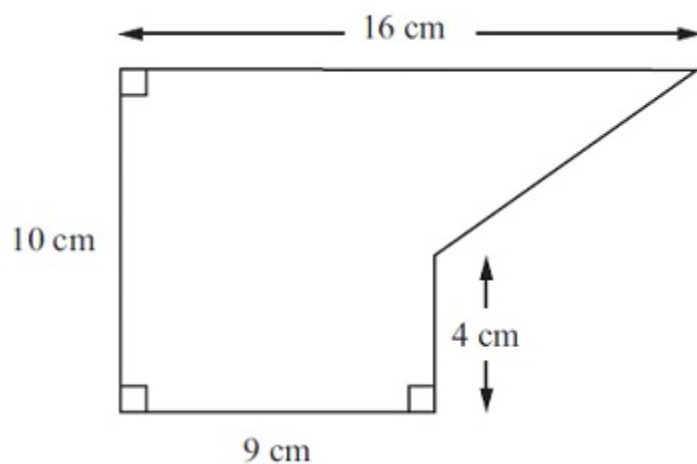


Diagram **NOT**
accurately drawn

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

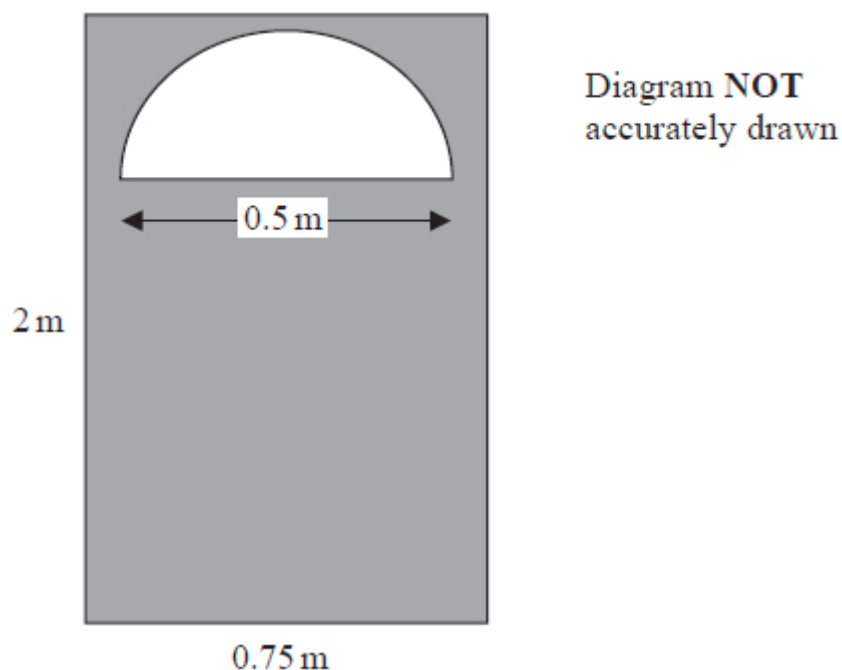
..... cm²

(Total for question = 2 marks)

Q21.



The diagram shows the front of a wooden door with a semicircular glass window.



Julie wants to apply 2 coats of wood varnish to the front of the door, shown shaded in the diagram.

250 millilitres of wood varnish covers 4 m^2 of the wood.

Work out how many millilitres of wood varnish Julie will need.
Give your answer correct to the nearest millilitre.

..... millilitres

(Total for question = 5 marks)

Mark Scheme



Q1.

Q	Working	Answer	Mark	Notes
(a)		hexagon	1	B1
(b)		correct pair	1	B1 arrows on two parallel sides and no others
(c)		correct pair	1	B1 crosses on two perpendicular sides and no others
(d)		-2, 7	1	B1
(e)		2, 6	2	B2 B1 for x-coord of 2 B1 for y-coord of 6
				Total 6 marks



Q2.

Question	Working	Answer	Mark	Notes
	$30 + 4x + 10 + x + 20 (= 5x + 60)$ or $180 - 30 (=150)$		4	M1 Allow $5x + 60 = n$ where $n \neq 180$ or for subtracting 30 from 180
	e.g. $30 + 4x + 10 + x + 20 = 180$ or $5x + 60 = 180$ oe or $180 - 30 - 10 - 20 (=120)$ oe eg $180 - 60$			M1 for setting up the equation or for subtracting all numerical values of angles from 180
	$5x = 120$ or " 120 " $\div 5$			M1 dep on M2 for correctly simplifying to $ax = b$ or for dividing " 120 " by 5
		24		A1 for 24
Total 4 marks				

Q3.

Q	Working	Answer	Mark	Notes
	$ADC = 180 - 58 (= 122)$ or $EDF = 122$ or $CDE = 58$ or $ADF = 58$		5	M1 may be seen marked on the diagram
	e.g. $DEF = 58 \div 2$ or $DEF = (180 - 122) \div 2$			M1 complete method to find angle DEF
		29		A1
				B2 dep on M2 for fully correct reasons for their method (B1 dep on M1 for one correct reason stated and used) e.g. <u>Allied angles</u> , <u>co-interior angles</u> , <u>Alternate angles</u> , <u>Corresponding angles</u> , <u>Vertically opposite angles</u> are equal (or <u>Vertically opposite angles</u> are equal), <u>Angles</u> on a straight <u>line</u> add up to 180° (or angles on a straight <u>line</u> add to 180°), Sum of <u>two angles</u> in a triangle are equal to <u>opposite exterior angle</u> , <u>Angles</u> in a <u>triangle</u> add up to 180° (or Angles in a <u>triangle</u> add up to 180°), Base angles in an <u>isosceles triangle</u> <u>Angles</u> in a <u>quadrilateral</u> add up to 360. (accept "4-sided shape" or parallelogram) <u>Opposite angles</u> of a <u>parallelogram</u> are equal
Total 5 marks				



Q4.

Question	Working	Answer	Mark	Notes
(a)		Angles do not add up to 360°	2	B2 (B1 for $245 + 135 = 380$)
(b) (i)		obtuse (angle)	1	B1 (any recognisable spelling)
(ii)		reflex (angle)	1	B1 (any recognisable spelling)
				Total 4 marks

Q5.

Q	Working	Answer	Mark	Notes
	$360 - 56 - 38 (= 266)$ or $x + x + 56 + 38 = 360$ oe			M1
	"266" $\div 2$			M1 dep
		133	3	A1
				Total 3 marks



Q6.

Q	Working	Answer	Mark	Notes
	$360 - (79 + 35)$ or 246		3	M1 or $(180 - 79) \div 2$ or 50.5 and $(180 - 35) \div 2$ or 72.5 or $79 \div 2$ or 38.5 and $35 \div 2$ or 17.5
	"246" $\div 2$			M1 (dep) or "50.5" + "72.5" or $180 - ("38.5"$ + "17.5")
		123		A1 cao
				Total 3 marks

Q7.

Question	Working	Answer	Mark	Notes
	$180 - 130 (=50)$ $180 - 2 \times "50"$	80	3	M1 M1 A1
				Total 3 marks

Q8.

Question	Working	Answer	Mark	Notes
(i)		60	1	B1 Look on diagram if no answer on answer line.
(ii)	$(BCD =) "60" + 52 (= 112^\circ)$ $(CBD \text{ or } BDC =) (180 - "112") \div 2 (= 34^\circ)$ $(DBC =) "60" - "34"$	26	3	M1ft Their ft from angle x. Can be marked on diagram. M1ft (Dep) Dependent on previous M1 Their x - "CBD" A1 cao
				Total 4 marks



Q9.

Ques	Working	Answer	Mark	Notes
	Angle $DAB = 110$		4	B1 can be implied by angle $DAX = \text{angle } BAX = 55^\circ$
	Angle $BAX = 110 \div 2 (= 55)$ or Angle $DAX = 110 \div 2 (= 55)$ or Angle $AXD = 55$			M1
	Angle $AXD = 55$ or Angle $CBA = 180 - 110 (=70)$ or Angle $ADC = 180 - 110 (=70)$			M1
		125		A1
				Total 4 marks

Q10.

Question	Working	Answer	Mark	Notes
	Angle $BCD = 142^\circ$ or Angle $BCF = 180 - 62$ ($=118^\circ$) or Angle $ABC = 180 - 142$ ($=38$)			M1 for angle $BCD = 142^\circ$ or angle $BCF = (180 - 62)^\circ$
	$360 - 142 - "118"$ or " 38 " + 62			M1 for a complete method to find x
		100	3	A1
				Total 3 marks



Q11.

Q	Working	Answer	Mark	Notes	
	Angle $BEF = 39^\circ$ or Angle $BCF = 63^\circ$			M1	
	Angle $CBF = 180 - 2 \times 63 (=54)$ or Angle $BFE = 180 - 2 \times 63 (=54)$			M1	
	$(x =) 180 - "39" - "54"$			M1	
		87 with reasons	5	A2	with fully correct reasons for their method (A1 for one reason correctly stated and used) e.g. <u>Alternate angles</u> <u>Angles</u> on a <u>straight line</u> add up to <u>180°</u> <u>Angles</u> in a <u>triangle</u> add up to <u>180°</u> Base <u>angles</u> in an <u>isosceles triangle</u>
					Total 5 marks

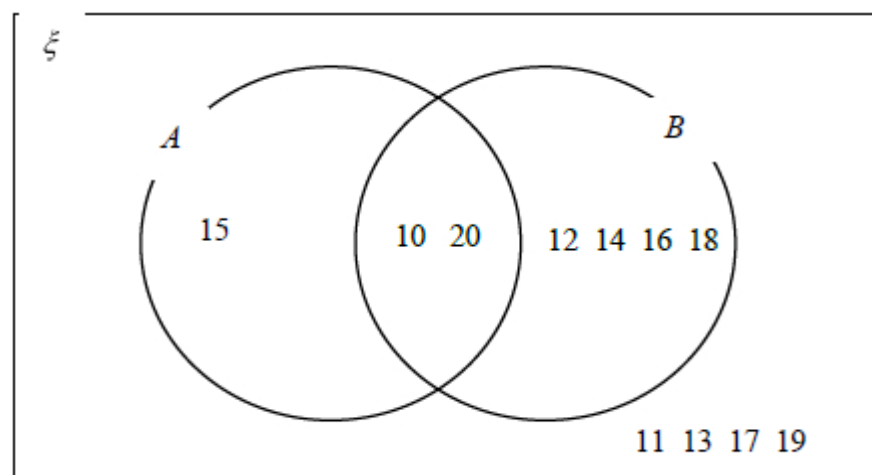


Q12.

Q	Working	Answer	Mark	Notes
	eg $\frac{1}{2} \times (20 + 26) \times 12 (= 276)$ or $12 \times 20 + \frac{1}{2} \times (26 - 20) \times 12 (= 276)$ or $12 \times 26 - \frac{1}{2} \times (26 - 20) \times 12 (= 276)$		5	M2 complete method to find the area of the shape M1 for method to find the area of a rectangle $12 \times 20 (= 240)$ or $12 \times 26 (= 312)$ or the area of the triangle $\frac{1}{2} \times (26 - 20) \times 12 (= 36)$
	"276" $\div 20 (= 13.8)$			M1 (indep) method to find the number of tins for their area ft any value from a calculation that includes at least two of 20, 26 & 12
	eg $3 \times \$40 + 2 \times \$13 (= \$146)$ or $14 \times \$13 (= \$182)$ or $4 \times \$40 (= \$160)$			M1 method to calculate a cost for their number of tins dep on previous M1 (NB: use $n \times \$40$ where n is the next multiple of 4 greater than the number of tins needed, divided by 4)
		146		A1 cao dep on accurate figures
				Total 5 marks

Q13.

Question	Working	Answer	Mark	Notes
	$(AC^2 =) 17^2 - 15^2$		5	M1
	$(AC =) \sqrt{17^2 - 15^2} (= \sqrt{64} = 8)$			M1
	$\frac{\pi \times '8'}{2} (= 4\pi = 12.566...)$			M1 dep on M2 for $\frac{\pi \times '8'}{2}$ oe or 4π 12.5663...
	'12.566...' + 15 + 17			M1 for '12.566' + 15 + 17 and no additional values
		44.6		A1 for awrt 44.6
				Total 5 marks



Q14.

Q	Working	Answer	Mark	Notes
	$8.5^2 - (8 \div 2)^2 (= 56.25)$ or $\cos x = \frac{4}{8.5}$		4	M1 or eg $\cos A = \frac{8^2 + 8.5^2 - 8.5^2}{2 \times 8 \times 8.5}$
	$\sqrt{56.25} (= 7.5)$ or $x = \cos^{-1}\left(\frac{4}{8.5}\right) (= 61.927\dots)$			M1 or eg $(A =) \cos^{-1}\left(\frac{8^2 + 8.5^2 - 8.5^2}{2 \times 8 \times 8.5}\right) (61.927\dots)$ (other angle = 56.144...)
	$8 \times "7.5" \div 2$ or $0.5 \times 8 \times 8.5 \times \sin "61.927\dots"$			M1 or eg $0.5 \times 8.5 \times 8 \times \sin 61.927\dots$ or
		30		A1
Total 4 marks				



Q15.

Question number	Working	Answer	Mark	Notes
(a)		(2, 4)	1	B1 cao
(b)		(-1, 3)	1	B1 cao
(c)		S plotted at 5, 3	1	B1 Accept X in place of S or rhombus in correct position
(d)	2 x 3 oe	6	2	M1 A1 SC B1 for 5 to 7 inclusive (but not 6) or 8
(e)		$x = 2$ oe	1	B1
				Total 6 marks

Q16.

Question	Working	Answer	Mark	Notes
(a)		(3, 2)	1	B1
(b)		(-4, -2)	1	B1
(c)		trapezium	1	B1
(d)		6.4	1	B1 Allow 6.3 to 6.5 inclusive.
(e)	$2 + 4 + 7 + \text{"6.4"}$		2	M1 "6.4" denotes ft from (d)
		19.4		A1 ft from (d)
(f)	$\frac{1}{2}(2+7)4$ or $2 \times 4 + \frac{1}{2} \times 5 \times 4$ or $7 \times 4 - \frac{1}{2} \times 5 \times 4$ or $8 + 10$		2	M1
		18		A1 cao
				Total 8 marks



Q17.

Q	Working	Answer	Mark	Notes
	$8 \times x (= 8x)$ or $14 \times x (= 14x)$ or $(14 - 8) \times x (= 6x)$ or $\frac{1}{2} \times (14 - 8) \times (13 - x) (= 39 - 3x)$ or $\frac{13+x}{2} \times (14-8) (= 39 + 3x)$ or $\frac{1}{2} \times 13 \times (14 - 8) (= 39)$ or $\frac{8+14}{2} \times x (= 11x)$ or $14 \times 13 (= 182)$ or $8 \times (13 - x) (= 104 - 8x)$ or $\left(\frac{8+14}{2} \times (13 - x) \right) (= 143 - 11x)$ oe		4	M1 one correct area linked to the shape
	$14x + 6 \times \frac{1}{2} \times (13 - x)$ oe eg $8x + \frac{x+13}{2} \times 6$ or $\frac{8+14}{2} \times x + \frac{13 \times (14-8)}{2}$ or “182” – $\left(\frac{8+14}{2} \times (13 - x) \right)$ or $11x + 39$ oe			M1 fit from correct working expression for total area of shape – with no parts omitted or duplicated Adding up parts of given shape or Large rectangle subtracting trapezium (or subtracting (rectangle + triangle))
	eg $11x + 39 = 91.8$ or $14x + 39 - 3x = 91.8$ or “182” – $143 + 11x = 91.8$ or $16x + 6x + 78 = 183.6$ oe			M1 fully correct equation with no fractions (allow 91.8 or multiples of 91.8 but no other decimals) and no brackets
	<i>Working not required, so correct answer scores full marks (unless from obvious incorrect working)</i>	4.8		A1 or $4\frac{4}{5}$ oe or $\frac{24}{5}$ oe
Total 4 marks				



Q18.

Question	Working	Answer	Mark	Notes
(a)	$2 \times \pi \times 9$ or $\pi \times 18$	56.5	2	M1 A1 for answer in range 56.5 – 56.6
(b)	$\sqrt{169}$ (=13) 5 × “13” oe	65	3	M1 M1 A1

Q19.

Q	Working	Answer	Mark	Notes
	$\pi \times 7.5^2$ or 3.14×7.5^2 or $\frac{22}{7} \times 7.5^2$ oe		2	M1 A correct method to find the area of the circle Students may use π or 3.14, 3.142 or $\frac{22}{7}$ oe
	<i>Working not required, so correct answer scores full marks (unless from obvious incorrect working)</i>	177		A1 answers in range 176.6 - 177
				Total 2 marks



Q20.

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 $\frac{1}{2} \times 7 \times 6$ or 21 or $\frac{1}{2} \times (16+9) \times 6$ or 75 16×10 or 160 or $\frac{1}{2} \times (4+10) \times 7$ or 49			M1 for area of one appropriate rectangle, triangle or trapezium
	eg. $\frac{1}{2} \times 7 \times 6 + 9 \times 10$ $\frac{1}{2} \times 7 \times 6 + 9 \times 4 + 9 \times 6$ $9 \times 4 + \frac{1}{2} \times (16+9) \times 6$ $16 \times 10 - \frac{1}{2} \times (4+10) \times 7$			M1 for complete method
		111		A1 cao
				Total 4 marks



Q21.

Q	Working	Answer	Mark	Notes
	$2 \times 0.75 (= 1.5)$ oe or $2 \times 0.75 \times 2 (= 3)$ oe		5	M1 for area of rectangle
	$\pi \times (0.5 \div 2)^2 (= 0.1963)$ or $\frac{1}{2} \times \pi \times (0.5 \div 2)^2 (= 0.09817)$			M1 for area of circle or area of semicircle
	"1.5" – "0.09817" (= 1.4018...) or "3" – "0.1963" (= 2.8036...)			M1
	"1.4018" $\times 2 \times 250 \div 4 (= 175.228...)$ or "2.8036" $\times 250 \div 4 (= 175.228...)$ or "1.4018" $\times 250 \div 4 (= 87.6...)$			M1 or for 87 – 88
	<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	175		A1 Allow 175 – 176
				Total 5 marks