

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

1 The probability that a spinner will land on blue is 0.4

Rayyan is going to spin the spinner 280 times.

Work out an estimate for the number of times the spinner will land on blue.

(Total for Question 1 is 2 marks)



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

2 Write 880 as a product of powers of its prime factors.
Show your working clearly.

(Total for Question 2 is 3 marks)



P 6 4 6 9 3 A 0 3 2 8

3 (a) Write 2.46×10^6 as an ordinary number.

.....
(1)

(b) Write 0.000 74 in standard form.

.....
(1)

(c) Work out $(5.6 \times 10^6) + (2.3 \times 10^5)$

.....
(2)

(Total for Question 3 is 4 marks)



DO NOT WRITE IN THIS AREA

4 Alexa has five cards.
Each card has a number on it.

The table gives information about the numbers on the five cards.

| Total | Median | Mode | Range |
|-------|--------|------|-------|
| 45 | 8 | 5 | 10 |

Using the information in the table, complete each card by writing its number on it.

(Total for Question 4 is 3 marks)

DO NOT WRITE IN THIS AREA



5 The length of a book is 33.8 cm, correct to one decimal place.

(a) Write down the lower bound of the length of the book.

..... cm
(1)

(b) Write down the upper bound of the length of the book.

..... cm
(1)

(Total for Question 5 is 2 marks)



6 Nav has worked out $\frac{68.3 \times 42.8}{0.021}$ on his calculator.

His answer is 139 201.9048

Without using a calculator and using suitable approximations, check that his answer is sensible.
Show your working clearly.

(Total for Question 6 is 2 marks)



7 Markus makes a steel framework.

The framework is in the shape of the right-angled triangle ABC shown in the diagram.

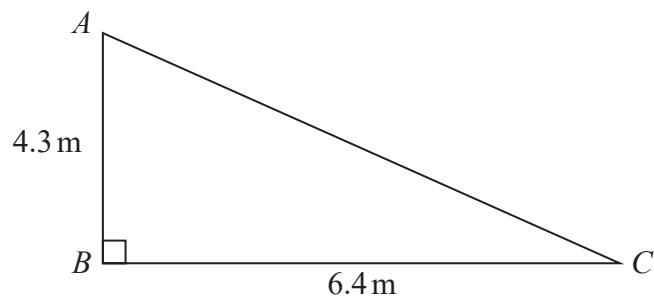


Diagram NOT
accurately drawn

The steel that Markus uses costs \$22 per metre.

The steel can **only** be bought in a length that is a whole number of metres.

Work out the total cost of the steel that Markus buys in order to make the framework.

\$.....

(Total for Question 7 is 4 marks)



8 Alison buys 2 boxes of strawberries, box A and box B.

Box A contains 15 strawberries.

The strawberries in box A have a mean weight of 24 grams.

Box B contains 25 strawberries.

The strawberries in box B have a mean weight of 18 grams.

Alison puts all 40 strawberries into a bowl.

Work out the mean weight of the 40 strawberries.

..... grams

(Total for Question 8 is 3 marks)



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

9 (a) Factorise $x^2 - x - 42$

.....
(2)

(b) Solve the inequality $3x + 15 < 8x + 3$

Show clear algebraic working.

.....
(3)

(Total for Question 9 is 5 marks)



P 6 4 6 9 3 A 0 9 2 8

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

10 Given that $150^x = 1$

(a) write down the value of x .

$$x = \dots \quad (1)$$

Given that $3^{-8} \div 3^{-6} = 3^n$

(b) find the value of n .

$$n = \dots \quad (1)$$

(Total for Question 10 is 2 marks)

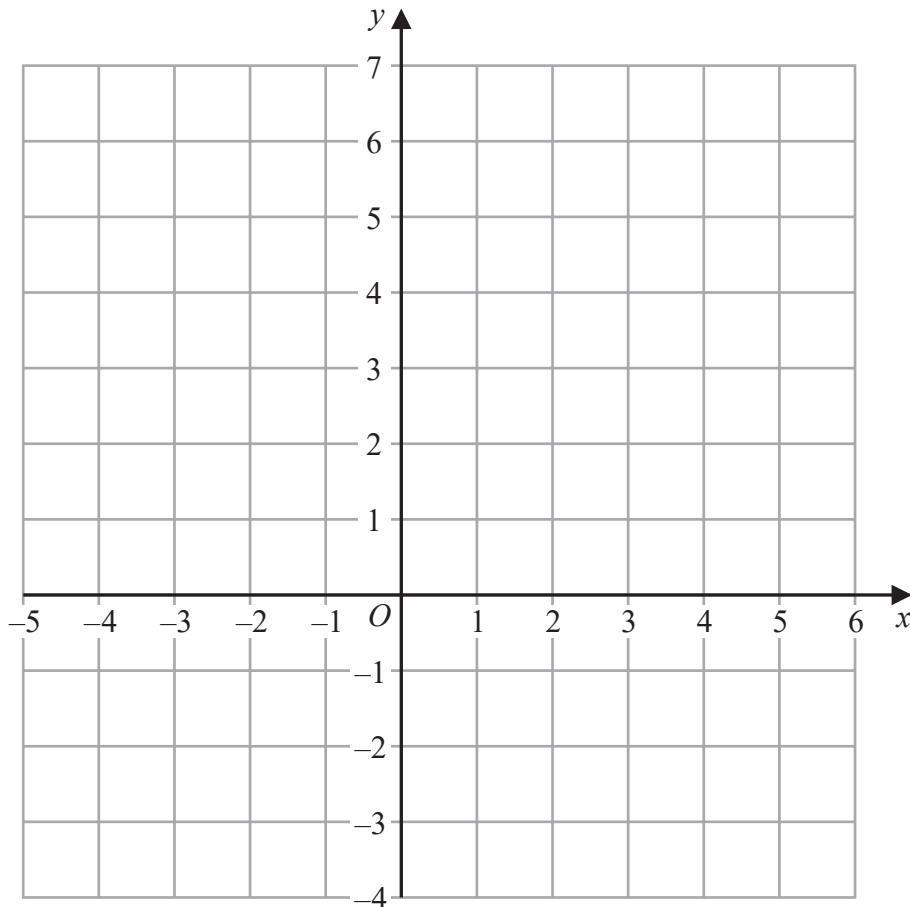


P 6 4 6 9 3 A 0 9 2 8

11 Show, by shading on the grid, the region that satisfies all three of the inequalities

$$x \leq 4 \quad \text{and} \quad y \geq -2 \quad \text{and} \quad y \leq x$$

Label the region **R**.



(Total for Question 11 is 3 marks)



12 Find the gradient of the straight line with equation $5x + 2y = 7$

.....
.....

(Total for Question 12 is 2 marks)

DO NOT WRITE IN THIS AREA

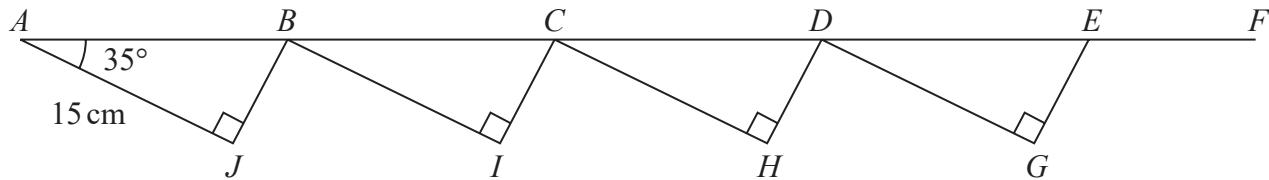
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



13 The diagram shows four congruent right-angled triangles ABJ , BCI , CDH and DEG .
The diagram also shows the straight line $ABCDEF$.

Diagram NOT
accurately drawn



$$AJ = 15 \text{ cm}$$

$$\text{Angle } BAJ = 35^\circ$$

$$AF = 80 \text{ cm}$$

Work out the length of EF .

Give your answer correct to 3 significant figures.

..... cm

(Total for Question 13 is 5 marks)



P 6 4 6 6 9 3 A 0 1 1 2 8

14 Sandeep sat 11 tests in January 2020
Each test was marked out of 60

Here are his test results.

45 41 35 44 38 47 47 39 37 43 42

(a) Find the interquartile range of these test results.
Show your working clearly.

.....
(3)

Sandeep also sat some tests in May 2020
Each test was marked out of 60

The median of the May 2020 test results is 42
The interquartile range of the May 2020 test results is 12

(b) In which month, January or May, were Sandeep's test results more consistent?
Give a reason for your answer.

.....
.....
.....
(1)

(Total for Question 14 is 4 marks)



DO NOT WRITE IN THIS AREA

15 Platinum nuggets are in the shape of a solid cylinder.

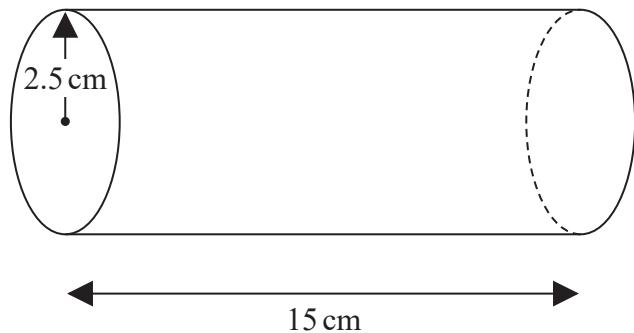


Diagram **NOT**
accurately drawn

The radius of each cylinder is 2.5 cm.

The length of each cylinder is 15 cm.

The density of platinum is 21.5 g/cm^3

The greatest mass that Jacques can carry is 30 kg.

Can Jacques carry 5 platinum nuggets at the same time?

You must show all your working.

(Total for Question 15 is 5 marks)



16

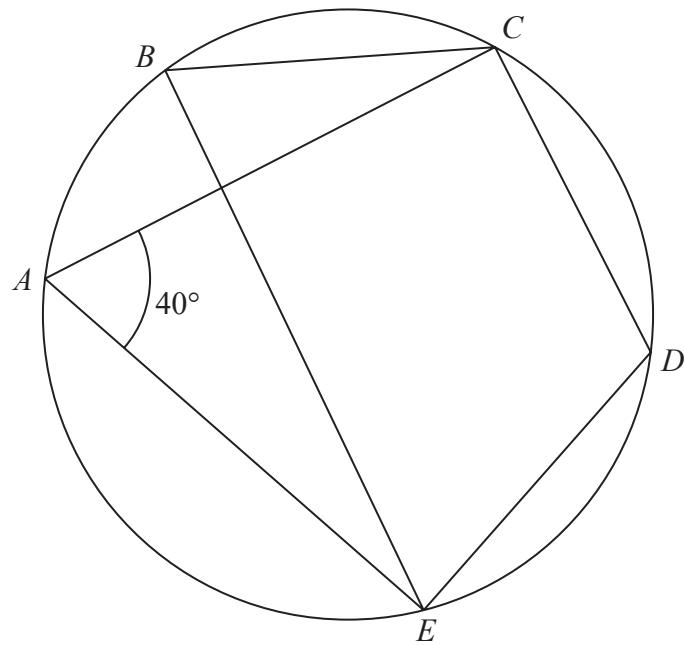


Diagram **NOT**
accurately drawn

A, B, C, D and E are points on a circle.

$\text{Angle } EAC = 40^\circ$

(a) (i) Write down the size of angle EBC .

.....
(1)

(ii) Give a reason for your answer.

.....
(1)

(b) Find the size of angle EDC .

.....
(1)

(Total for Question 16 is 3 marks)



DO NOT WRITE IN THIS AREA

17 Given that $n > 0$

make n the subject of the formula $y = \frac{n^2 + d}{n^2}$

(Total for Question 17 is 4 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

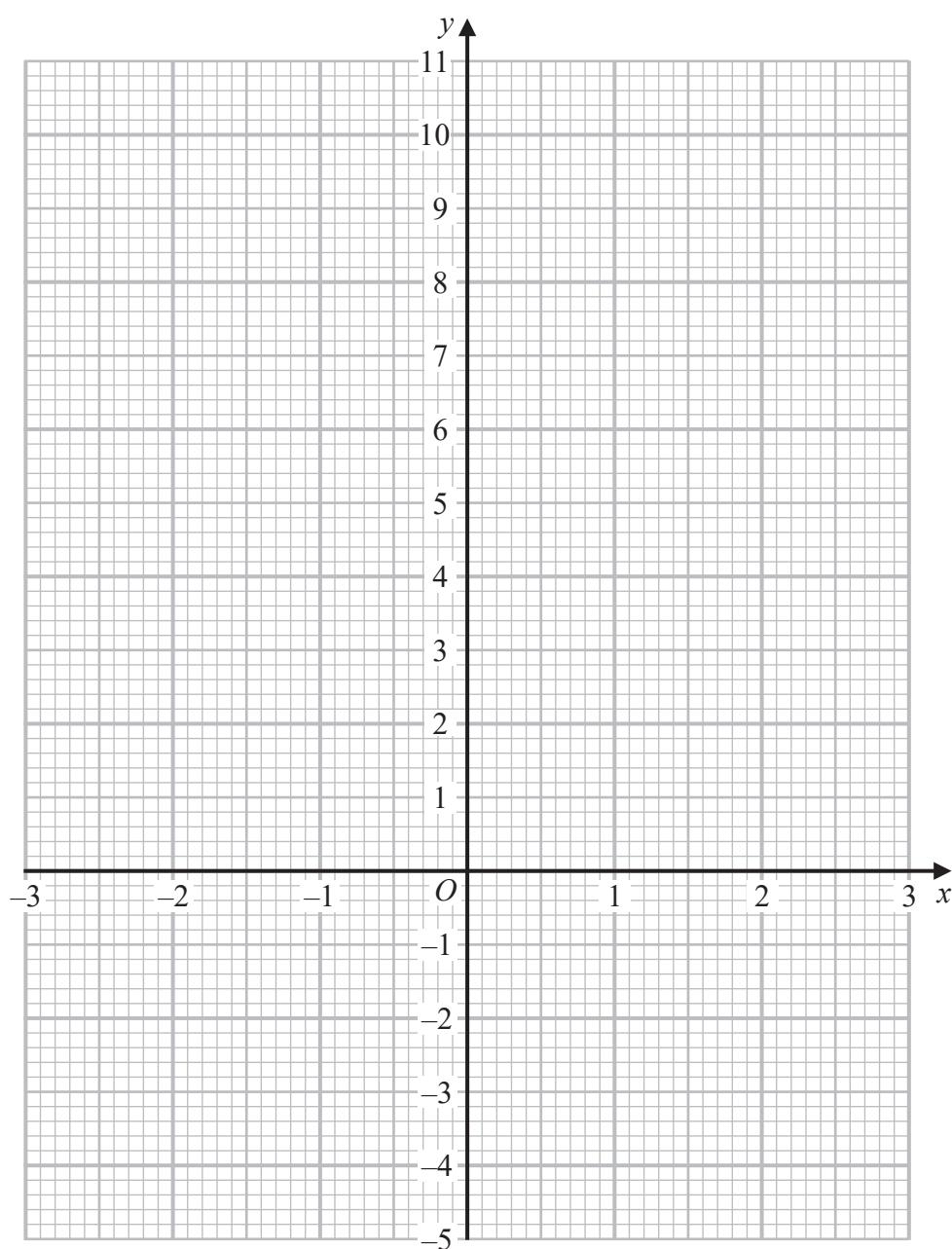


18 (a) Complete the table of values for $y = \frac{1}{2}x^3 - 2x + 3$

| | | | | | | | |
|-----|------|----|----|---|---|---|---|
| x | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| y | -4.5 | | | 3 | | 3 | |

(b) On the grid, draw the graph of $y = \frac{1}{2}x^3 - 2x + 3$ for $-3 \leq x \leq 3$

(2)



(2)



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(c) By drawing a suitable straight line on the grid, find an estimate for the solution of the equation $\frac{1}{2}x^3 - x + 4 = 0$

$x = \dots$
(2)

(Total for Question 18 is 6 marks)



19

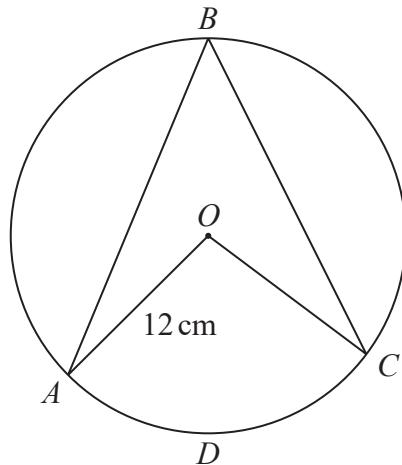


Diagram **NOT**
accurately drawn

A , B , C and D are points on a circle with centre O and radius 12 cm.

The area of the sector $OADC$ of the circle is 100 cm^2

Work out the size of angle ABC .

Give your answer correct to 3 significant figures.

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(Total for Question 19 is 4 marks)



DO NOT WRITE IN THIS AREA

20 T is inversely proportional to m^2

$$T = 30 \text{ when } m = 0.5$$

(a) Find a formula for T in terms of m .

.....
(3)

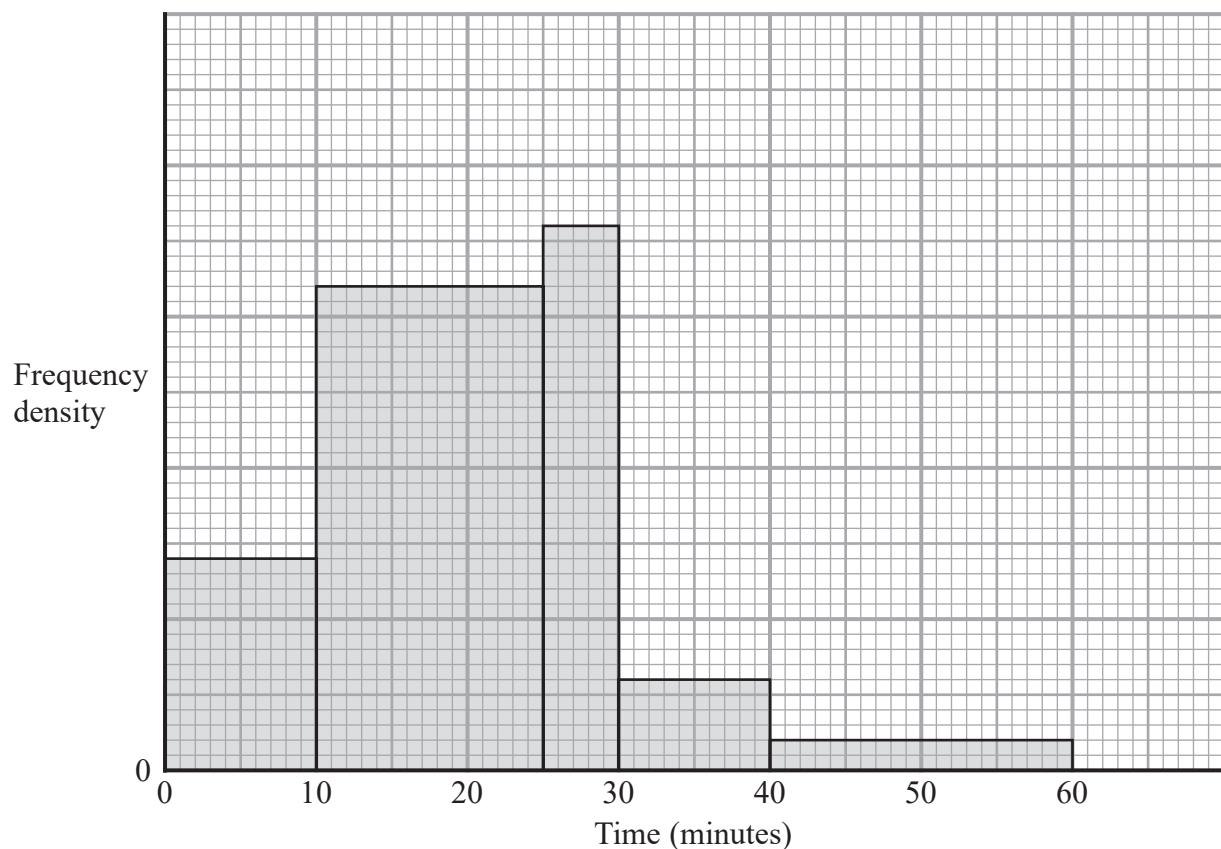
(b) Work out the value of T when $m = 0.1$

.....
(1)

(Total for Question 20 is 4 marks)



21 The histogram gives information about the times, in minutes, some customers had to wait to be served in a restaurant.



14 customers had to wait less than 10 minutes to be served.

Work out the number of customers who had to wait less than 60 minutes to be served.

(Total for Question 21 is 3 marks)



DO NOT WRITE IN THIS AREA

22 The curve with equation $x^2 - x + y^2 = 10$ and the straight line with equation $x - y = -4$ intersect at the points A and B .

Work out the exact length of AB .

Show your working clearly and give your answer in the form $\frac{\sqrt{a}}{2}$ where a is an integer.

.....
(Total for Question 22 is 6 marks)



P 6 4 6 9 3 A 0 2 1 2 8

23 P and Q are two points.

The coordinates of P are $(-1, 6)$

The coordinates of Q are $(5, -4)$

Find an equation of the perpendicular bisector of PQ .

Give your answer in the form $ax + by + c = 0$ where a , b and c are integers.

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(Total for Question 23 is 6 marks)



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

24 (a) Write $7 + 12x - 3x^2$ in the form $a + b(x + c)^2$ where a , b and c are integers.

.....
(4)

The curve **C** has equation $y = 7 + 12x - 3x^2$

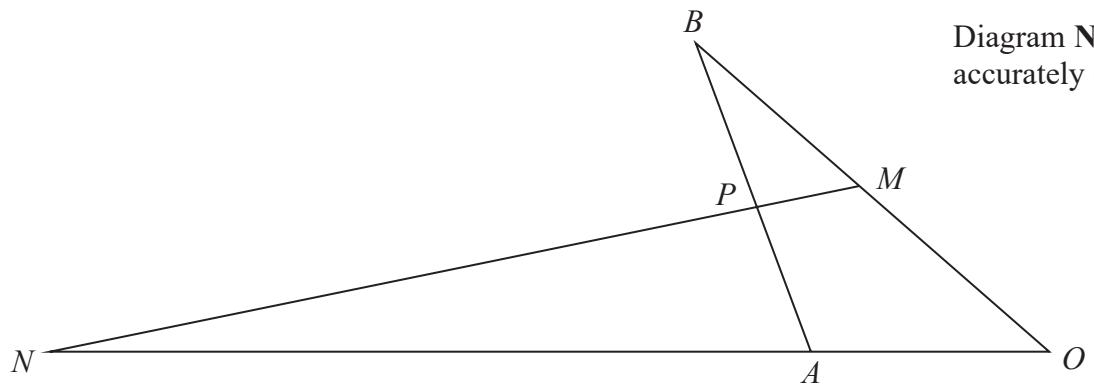
The point **A** is the turning point on **C**.

(b) Using your answer to part (a), write down the coordinates of **A**.

(.....,)
(1)

(Total for Question 24 is 5 marks)



25**Diagram NOT
accurately drawn**

OAN , OMB , APB and MPN are straight lines.

$$OA:AN = 1:4$$

$$OM:MB = 1:1$$

$$\overrightarrow{OA} = 2\mathbf{a} \quad \overrightarrow{OB} = 2\mathbf{b}$$

By using a vector method, find the ratio $AP:PB$

Give your answer in its simplest form.

DO NOT WRITE IN THIS AREA**DO NOT WRITE IN THIS AREA****DO NOT WRITE IN THIS AREA**

(Total for Question 25 is 5 marks)



26 A, B, D and E are points on a circle. ABC and EDC are straight lines.

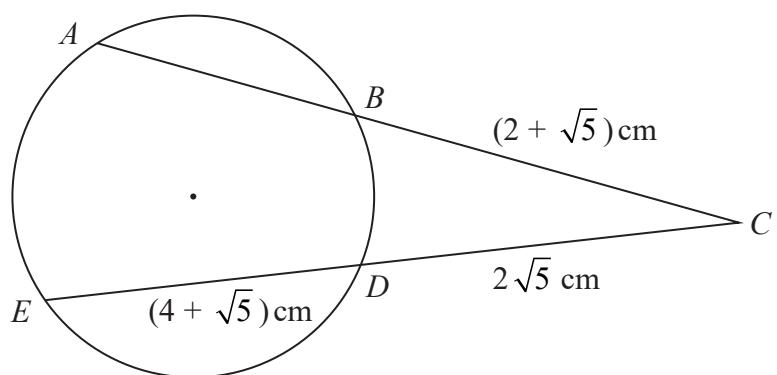


Diagram **NOT**
accurately drawn

$$BC = (2 + \sqrt{5}) \text{ cm}$$

$$ED = (4 + \sqrt{5}) \text{ cm}$$

$$DC = 2\sqrt{5} \text{ cm}$$

Show that the length of AB is $(p\sqrt{5} + q)$ cm, where p and q are integers whose values are to be found.

Show your working clearly.

(Total for Question 26 is 5 marks)

