



THIRD SPACE
LEARNING

Mathematics

Paper 6

(Calculator)

Higher Tier

OCR GCSE

SET 3

Mathematics Paper 6 (Calculator) Higher Tier OCR GCSE

SET 3

Name

Total marks

Paper length: 1hr 30mins



Question	Mark
1	
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Instructions

- Use black ink or ball-point pen.
- Fill in the boxes at the top of this page with your name, centre number and candidate number.
- Answer all questions.
- Answer the questions in the spaces provided – there may be more space than you need.
- You must show all your working.
- Diagrams are NOT accurately drawn, unless otherwise indicated.
- Calculators may be used.

Information

- The total mark for this paper is 100
- The marks for each question are shown in brackets – use this as a guide as to how much time to spend on each question.

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. Tracing paper may be used.

This practice paper is based on the topics from the **advanced information for the November 2024 exam series**.

Please note, this practice paper is an example to help revision, these topics can be tested in other ways and other topics may be included in the actual papers

- 1 The first four terms of a sequence are

$m + 2$

$3m + 3$

$5m + 4$

$7m + 5$

The difference between the first and third terms of the sequence is 12.

- (a) Work out the value of m .

(a) $m =$ [2]

- (b) Work out the fifth term in the sequence.

(b) [1]

-
- 2 Fill in the blanks to make these statements correct.

(a) $0.6 < \frac{\text{.....}}{8} < 0.7$

[1]

(a) 0.02% is equivalent to $\frac{1}{\text{.....}}$

[1]

3 The manager of a clothes shop records the size of the clothes sold one day.

8				
10	10	10		
12	12	12	12	12
14	14			
16	16	16		
18	18			

(a) Work out the mean size of the clothes sold that day.

(a) _____ [2]

(b) Emily says that the mean is not a very useful average.

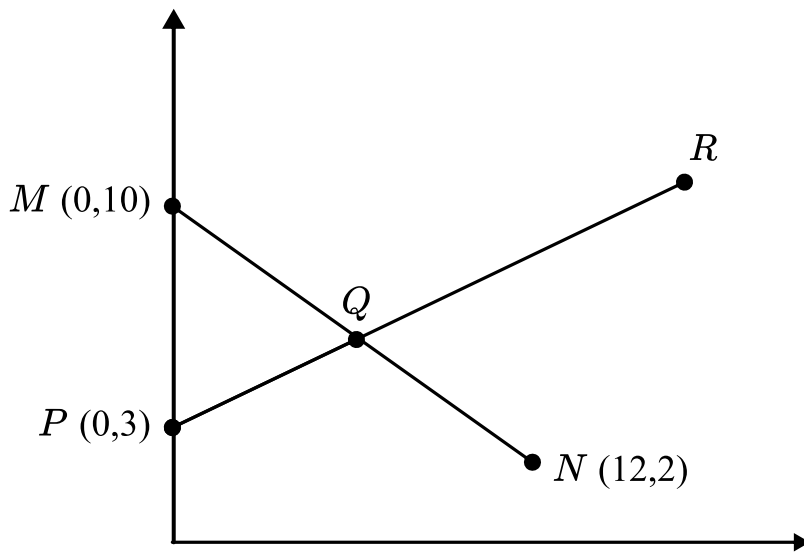
Explain why Emily is correct.

_____ [1]

(c) Which average would be the most useful in this example? Explain why.

_____ [2]

- 4 The point Q is the midpoint of the line MN .
The point Q lies on the line PR such that $PQ:QR = 1:2$.



Find the coordinates of the point R .

(..... ,) [3]

- 5 The speed limit in a village is changed from 30 *mph* to 20 *mph*.
Before the speed limit was changed, it took Beth five minutes to drive through the village.

(a) What distance does Beth travel through the village?

(a) [2]

(b) Mark says that the journey will now take Beth one minute longer.

Is Mark correct?

Show how you decide.

(b) [2]

-
- 6 The speed of light is 3×10^8 *m/s*.

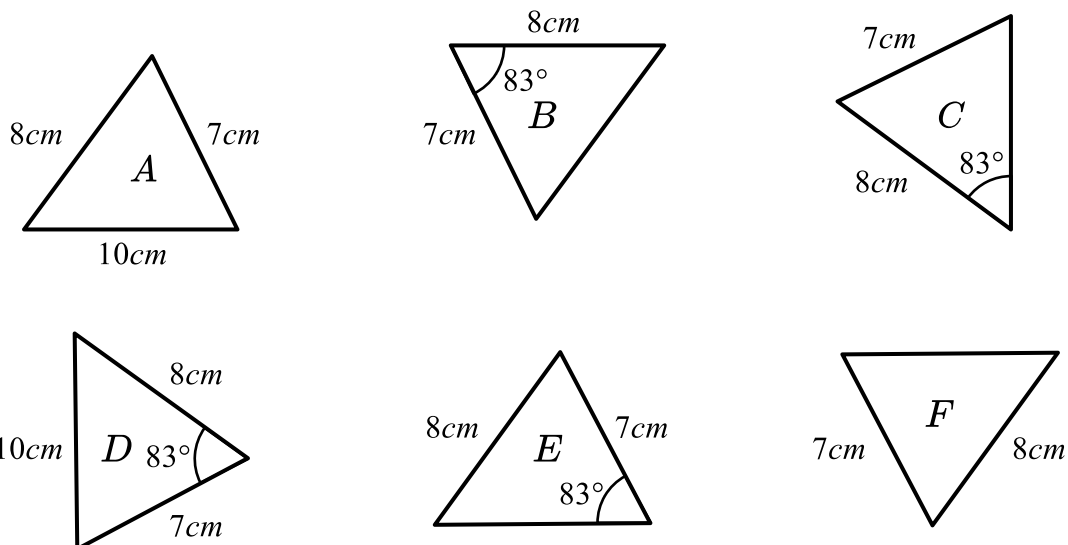
The sun is 147.1 million km from the Earth.

Calculate the time taken for the light from the sun to reach the Earth.

Give your answer to the nearest second.

..... *seconds* [4]

7 Here are 6 triangles.



(a) Complete the following statement.

Triangles and are congruent by SAS

[1]

(b) Complete these statements by ticking the correct option

(i) Triangles *A* and *D* are congruent by

☐

SAS

☐

ASA

☐

SSS

☐

RHS

[1]

(ii) Triangles *C* and *F*

☐

are not congruent

☐

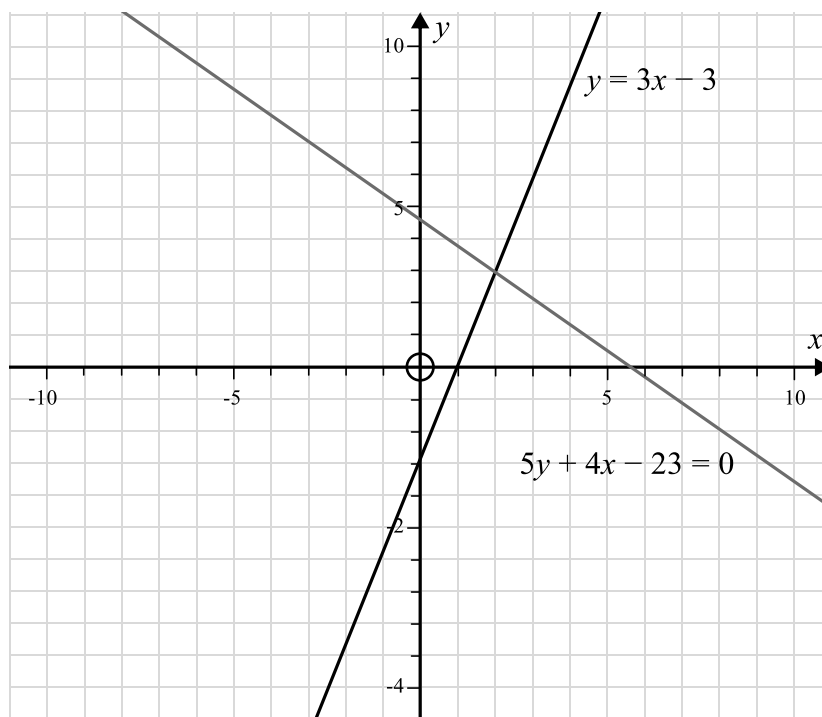
could be congruent

☐

are congruent

[1]

8



(a) Use these graphs to solve the simultaneous equations

$$y = 3x - 3$$

$$5y + 4x - 23 = 0$$

(a) $x =$

$y =$

[1]

(b) Work out the gradient of the line $5y + 4x - 23 = 0$

(b) [2]

(c) Are the graphs parallel, perpendicular or neither?

You must show how you decide.

(c) [2]

- 9 In a bag there are only red counters, blue counters, yellow counters and green counters.
A counter is going to be taken at random from the bag.

The table shows the probability of taking a red counter or a blue counter from the bag.

Colour	red	blue	yellow	green
Probability	0.15	0.25		

The probability of taking a yellow counter is twice the probability of taking a green counter.

- (a) Complete the table.

[2]

There are 135 red counters in the bag.

- (b) Work out the number of blue counters in the bag.

(b) [2]

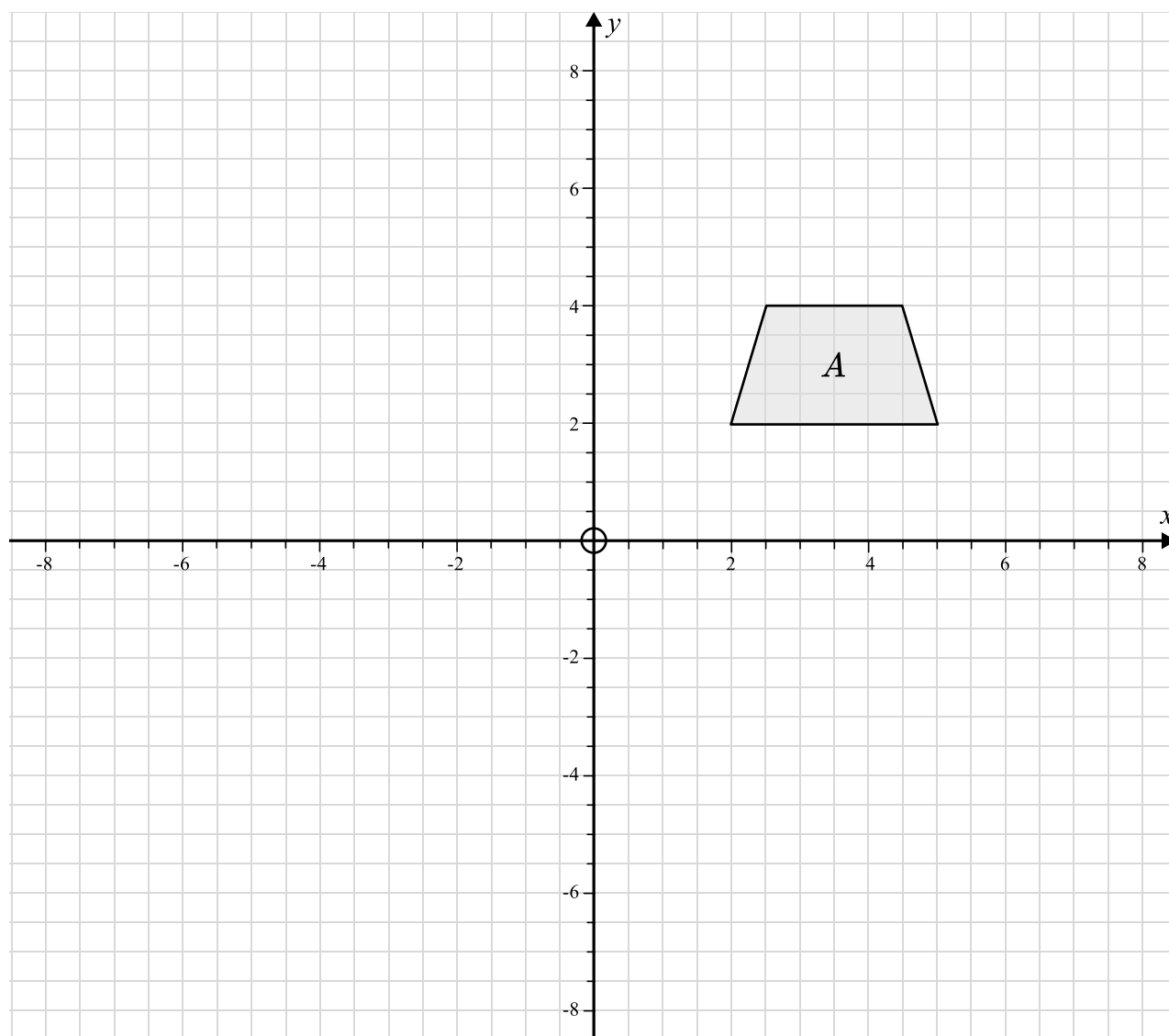
- (c) Phillip takes three counters.

Work out the probability that none of the counters are red.

Give your answer as a decimal to 3 decimal places.

(c) [4]

10



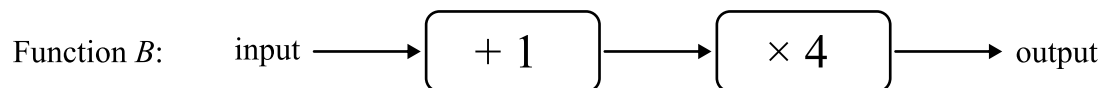
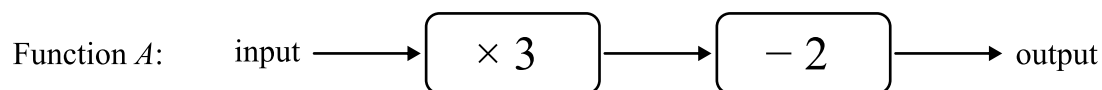
Shape A is reflected in the line $x = 1$ to give shape B .

Shape B is then reflected in the x axis to give shape C .

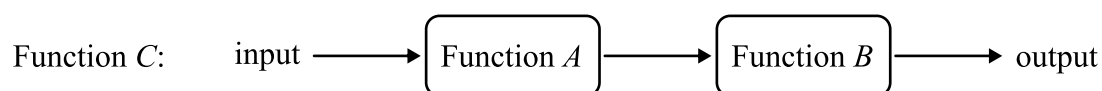
Describe fully the single transformation which maps shape A onto shape C .

[3]

11 Here are two functions.



Composite function C is shown below.

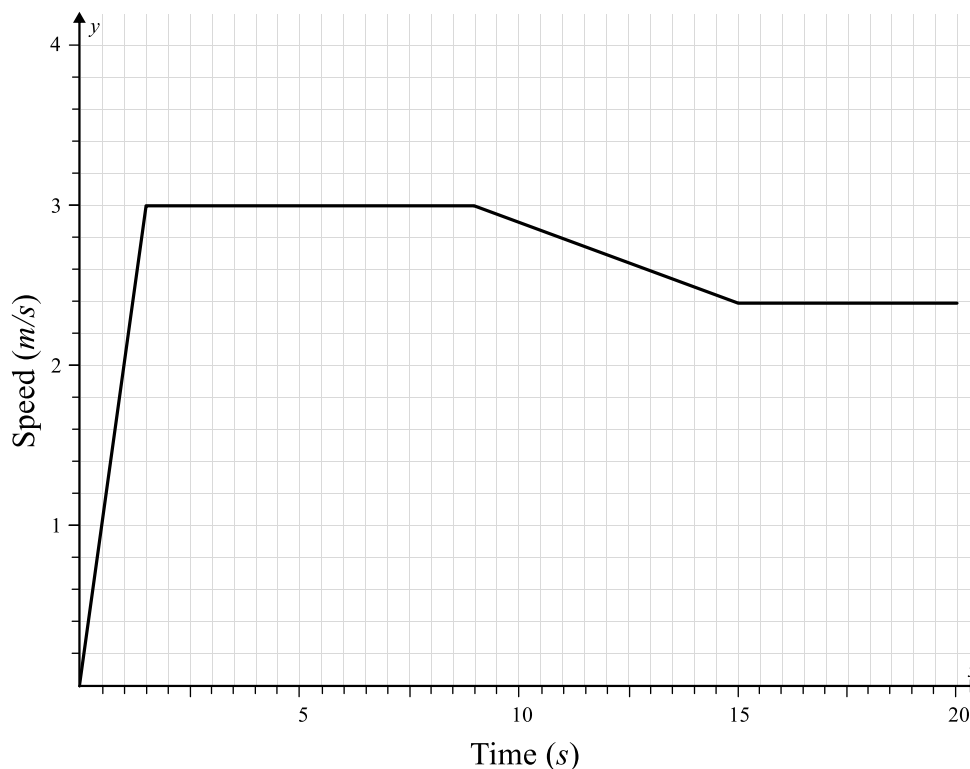


The input to function C is x .

Find an expression, in terms of x , for the output from function C .

..... [2]

12 (a) The graph shows the speed of a runner during the first 20 seconds of a race.



(i) Find the acceleration of the runner for the first 1.5 seconds

(a)(i) m/s^2 [2]

(ii) Find the acceleration of the runner between 1.5 and 9 seconds

(a)(ii) m/s^2 [1]

(iii) Work out the distance travelled by the runner during the 20 seconds.

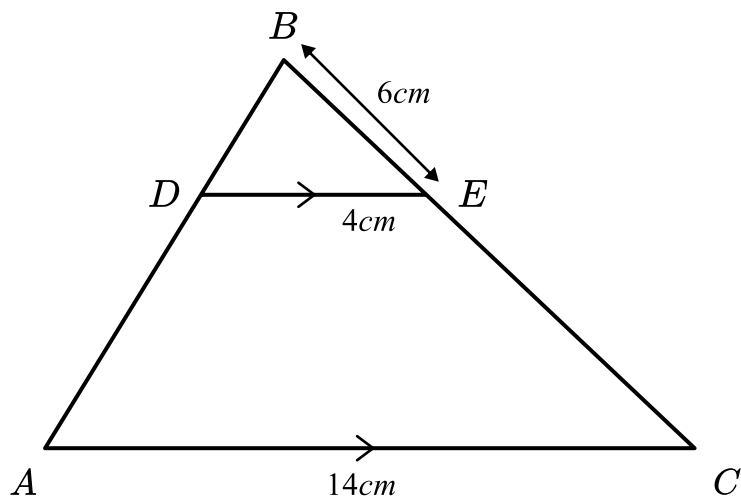
(a)(iii) m [4]

(b) Convert 20 metres per second to miles per hour.

You may use the conversion $5 \text{ miles} = 8 \text{ km}$.

(b) mph [2]

- 13 In the diagram, AC is parallel to DE .



$$DE = 4\text{cm}$$

$$AC = 14\text{cm}$$

$$BE = 6\text{cm}$$

Work out the length CE .

..... cm [3]

14 $bx^6 = (3x^2)^c$

Work out the values of b and c .

$b =$

$c =$

[3]

15 (a) Peter invests £2000 in a savings account for 3 years.

He is paid compound interest at a rate of 4% per annum.

How much money does Peter have in his account at the end of the 3 years?

(a) £ **[2]**

(b) Charlie invests £2000 in a different bank account, which also pays compound interest.

After 3 years, there is £2275.79 in her account.

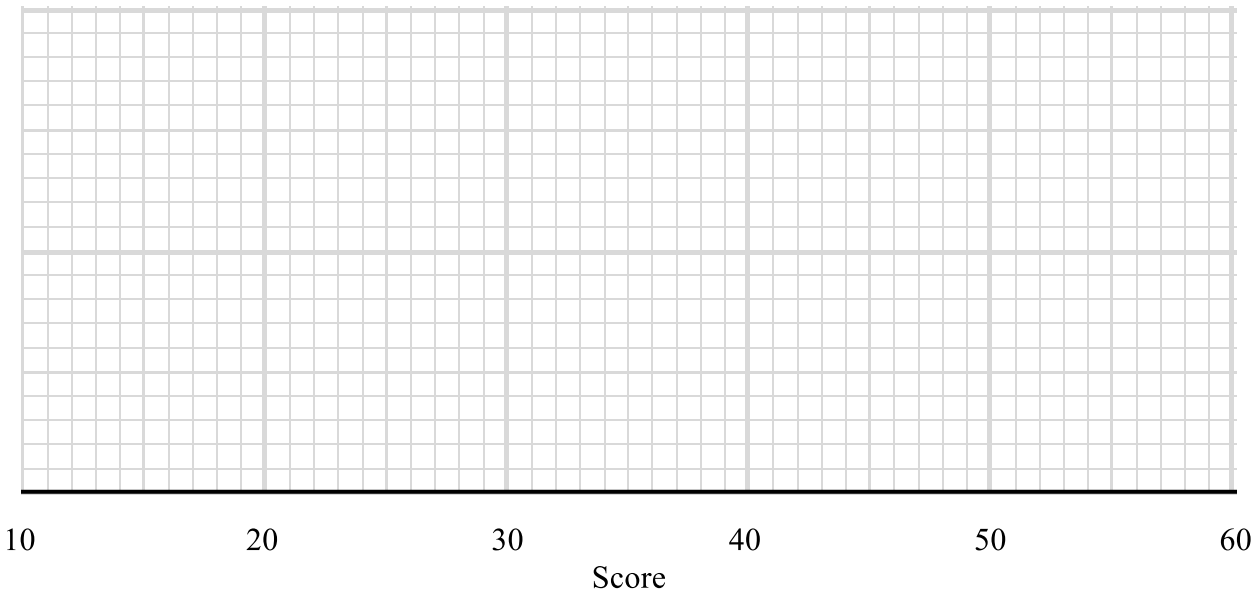
Work out the interest rate of Charlie's bank account.

(b) % **[3]**

16 Here is some data about the test scores of 27 students in a class. The test scores are out of 60.

11	12	12	15	19	20	21	21	26	27	29
33	33	33	37	39	41	42	43	45	48	49
50	52	53	58	59						

(a) On the grid, draw a box plot for this information.



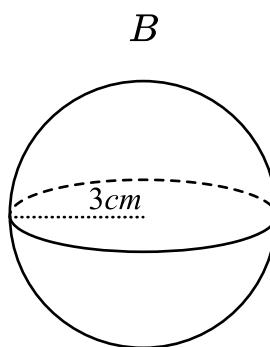
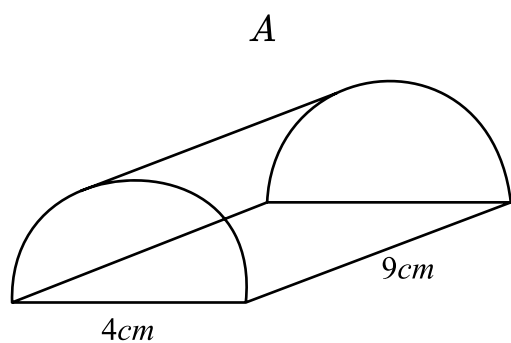
[3]

Students passed the test if they scored 60% or above.

(b) Find the probability that two students, picked at random, both passed the test.

(b) [3]

17 Here are two shapes, *A* and *B*.



Not drawn
accurately

Volume of a Cylinder: $V = \pi r^2 h$

Volume of a Sphere: $V = \frac{4}{3} \pi r^3$

How many times bigger is the volume of shape *B* than the volume of shape *A*?
You must show your working.

Shape *B* is times bigger than shape *A* [4]

18 (a) Show that the equation $x^3 - 6x + 2 = 0$ has a solution between $x = 2$ and $x = 3$.

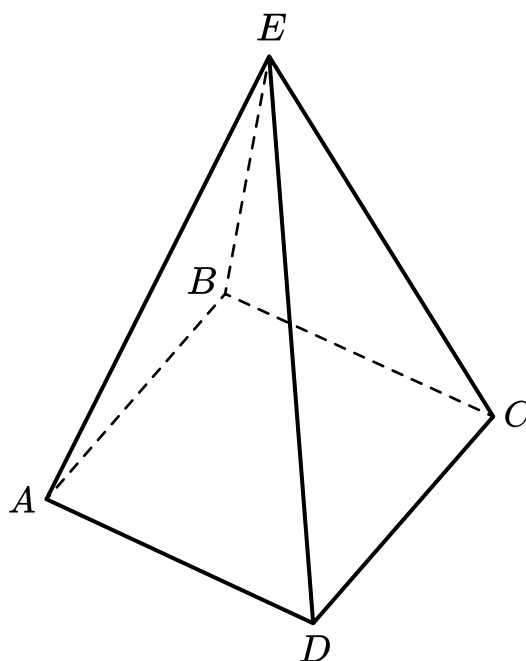
[3]

(b) Find this solution correct to 1 decimal place.

You must show your working.

(b) $x =$ **[3]**

19 Here is a pyramid.



The base of the pyramid is a square, with an area of 36cm^2 .

The vertex E is 9cm vertically above the midpoint of AC .

Work out the exact surface area of the pyramid.

..... cm^2 [4]

20 The ratio $a : a + b$ can be written in the form $1 : k$.

Show that $a = \frac{b}{k - 1}$

[3]

21 Solve the equation $\frac{x + 1}{x - 3} = \frac{x - 7}{3x - 1}$, giving your answers to 2 decimal places.

$x =$ or $x =$ **[5]**

22 Vector $\mathbf{a} = \begin{pmatrix} p \\ 4 \end{pmatrix}$ and vector $\mathbf{b} = \begin{pmatrix} q \\ 2 \end{pmatrix}$

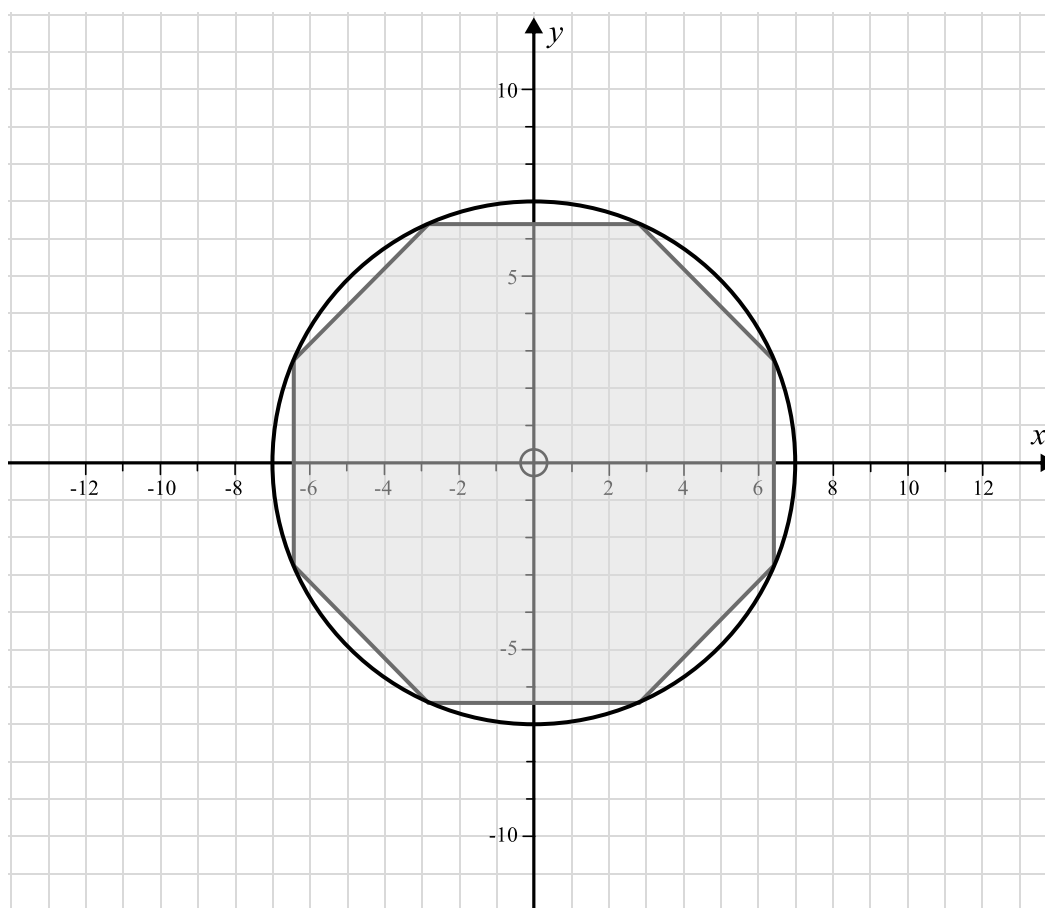
Vector \mathbf{b} is parallel to $\begin{pmatrix} 2 \\ 1 \end{pmatrix}$

Vector $2\mathbf{a} - \mathbf{b}$ is parallel to $\begin{pmatrix} 4 \\ 1 \end{pmatrix}$

Work out the value of p .

$p =$ [5]

23



A regular octagon is inscribed inside the circle with equation $x^2 + y^2 = 50$.

Show that the area of the octagon is $a\sqrt{2}$ and find the value of a .

[5]

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