OXFORD INTERNATIONAL AQA EXAMINATIONS

Please write clearly, in block capitals.

Centre number ☐☐☐☐☐   Candidate number ☐☐☐☐

Surname _____

Forename(s) _____

Candidate signature _____

OXFORD AQA INTERNATIONAL GCSE

MATHEMATICS EXTENSION

PAPER 1E   (9260/1E)

Specimen 2018   Morning   Time allowed: 2 hours

Materials

For this paper you must have:
- a calculator
- mathematical instruments.

Instructions
- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the space provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work that you do not want to be marked.
- In all calculations, show clearly how you work out your answer.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 100
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer booklet.

Answer **all** questions in the spaces provided.

1 Circle the equation with roots 4 and −8

[1 mark]

$$4x(x - 8) = 0 \qquad\qquad (x - 4)(x + 8) = 0$$

$$x^2 - 32 = 0 \qquad\qquad (x + 4)(x - 8) = 0$$

2 A menu has a choice of 3 starters, 5 main courses and 4 desserts.

How many different choices of a 3-course meal are possible?
Circle your answer.

[1 mark]

$$12 \qquad\qquad 23 \qquad\qquad 60 \qquad\qquad 972$$

3 $f(x) = 3x$

Circle the expression for $f^{-1}(x)$

[1 mark]

$$-3x \qquad\qquad \frac{3}{x} \qquad\qquad \frac{1}{3x} \qquad\qquad \frac{x}{3}$$

4 $\mathbf{a} = \begin{pmatrix} 5 \\ -2 \end{pmatrix}$ and $\mathbf{b} = \begin{pmatrix} -2 \\ 3 \end{pmatrix}$

Circle the vector $\mathbf{a} - \mathbf{b}$

[1 mark]

$\begin{pmatrix} -3 \\ -5 \end{pmatrix}$ $\begin{pmatrix} 7 \\ 1 \end{pmatrix}$ $\begin{pmatrix} 3 \\ 1 \end{pmatrix}$ $\begin{pmatrix} 7 \\ -5 \end{pmatrix}$
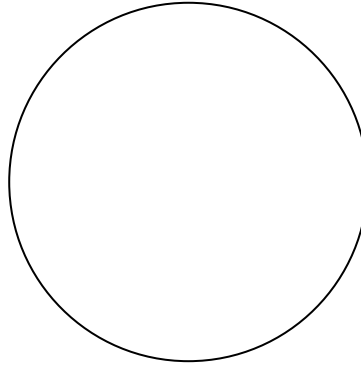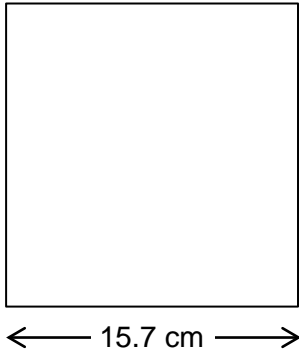
5   Solve $5(x + 4) = 3(x + 7) + 2$

[4 marks]

$x = $ _____

6 A square of side 15.7 cm is made from a length of wire.

The same length of wire is then made into a circle.

Not drawn accurately

← 15.7 cm →

Work out the diameter of the circle.

[4 marks]

Answer _____ cm

7 Written as the product of its prime factors $672 = 2^5 \times 3 \times 7$

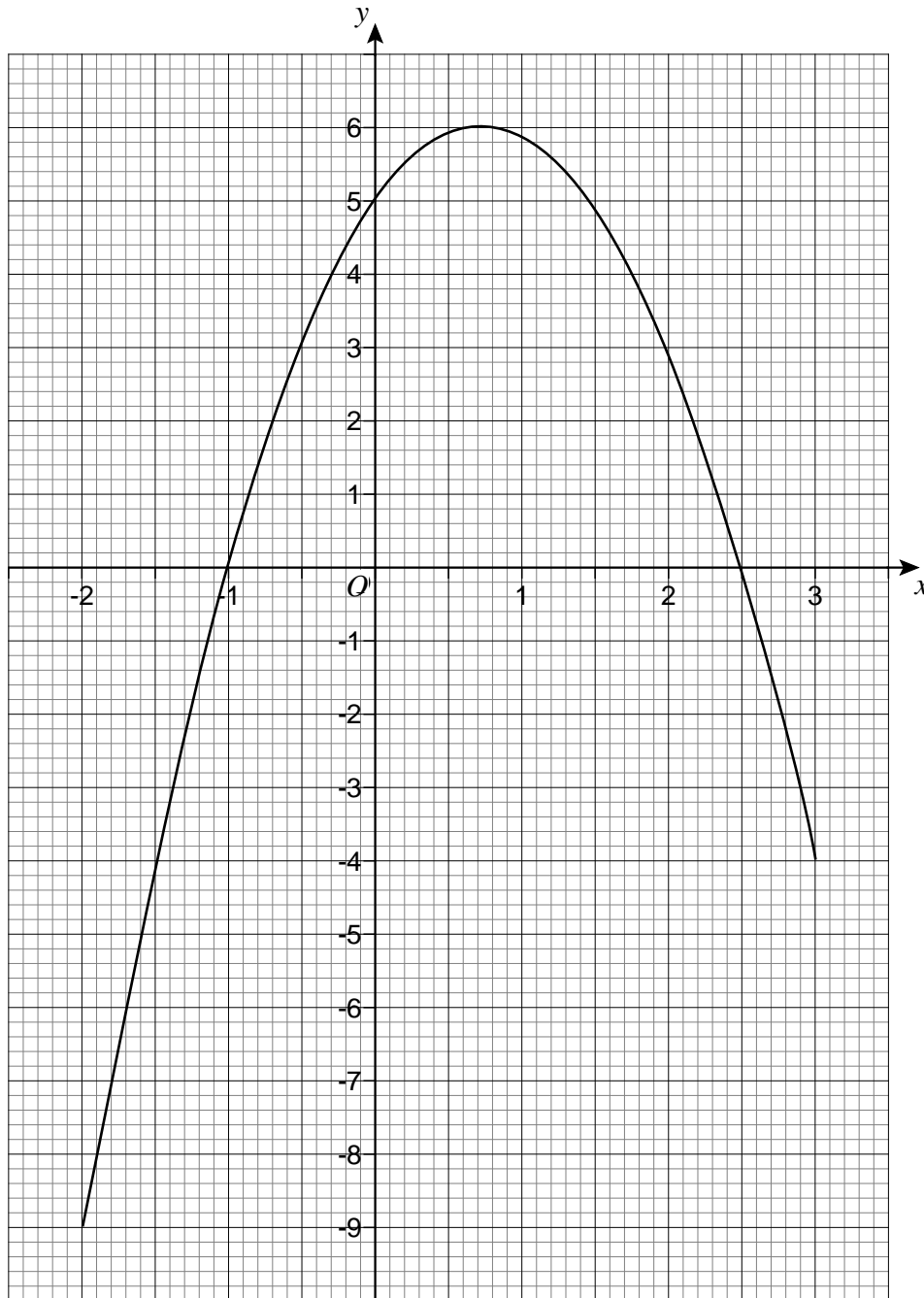**7 (a)** Write 252 as the product of its prime factors.

[2 marks]

Answer _____

7 (b) Work out the value of the highest common factor of 672 and 252

[1 mark]

Answer _____

8 The graph of $y = 5 + 3x - 2x^2$ is shown for values of x from -2 to 3

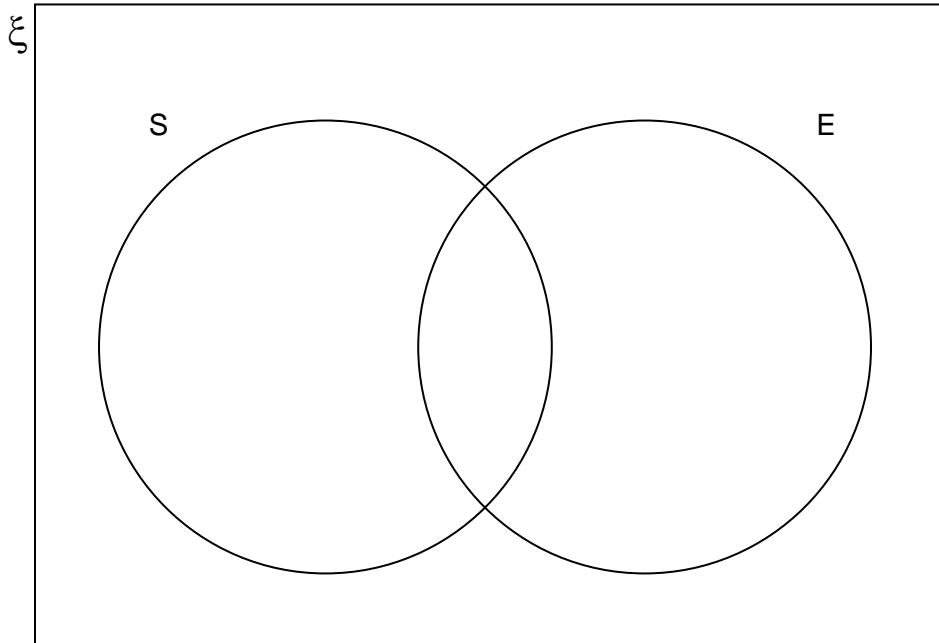Write down the solutions of $5 + 3x - 2x^2 = 0$

[2 marks]

Answer _____ and _____

9 $\xi = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$

S = square numbers

E = even numbers

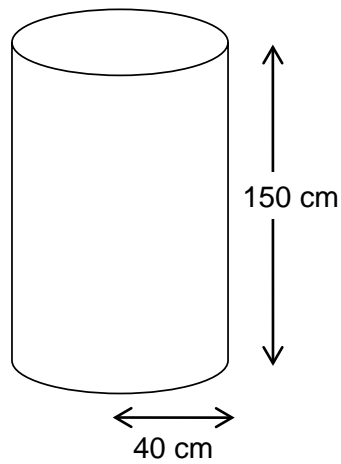**9 (a)** Complete the Venn diagram.

[3 marks]

9 (b) One of the numbers is chosen at random.

Write down P(S ∩ E)

[1 mark]

Answer _____

10 A water tank is a cylinder with radius 40 cm and depth 150 cm

Not drawn
accurately

150 cm

40 cm

It is filled at the rate of 0.2 litres per second.

1 litre $= 1000$ cm^3

Does it take longer than 1 hour to fill the tank?
You **must** show your working.

[4 marks]

Answer _____

11 (a) Use your calculator to work out $19.42^2 - \sqrt[3]{1006} \div 4.95$
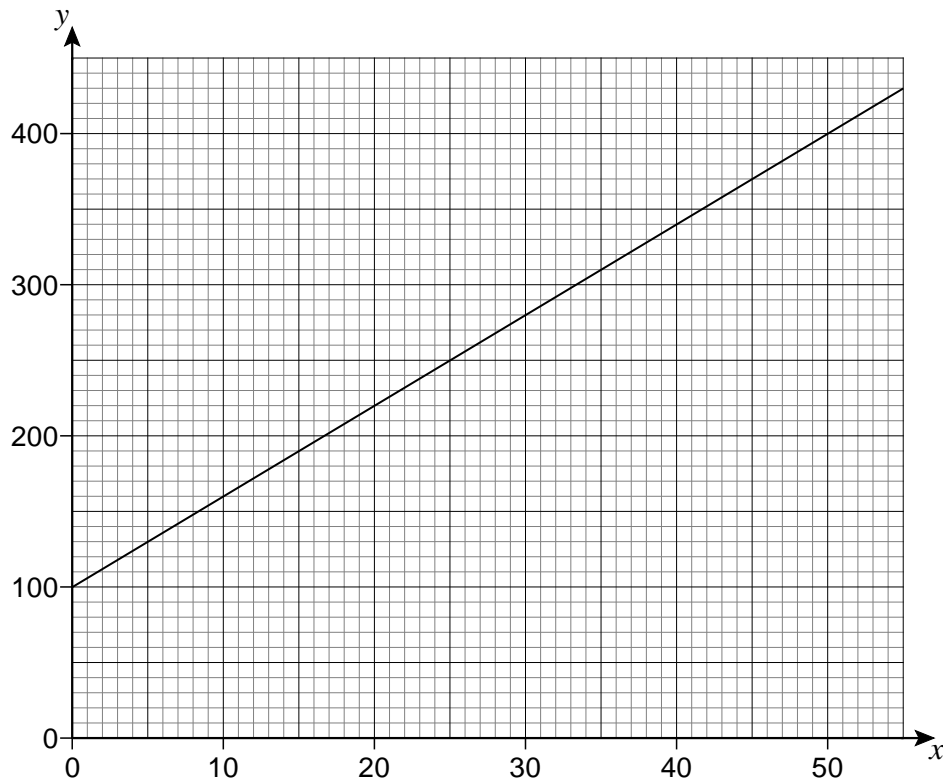
Write down your full calculator display.

[1 mark]

Answer _____

11 (b) Use approximations to check your answer to part (a) is sensible.
You **must** show your working.

[2 marks]

_____

_____

_____

_____

_____

12 The graph shows the line $y = ax + b$

Work out the values of a and b.

[2 marks]

_____

_____

_____

_____

_____

$a =$ _____

$b =$ _____

13 White paint costs $2.80 per litre.
Blue paint costs $3.50 per litre.
White paint and blue paint are mixed in the ratio 3 : 2

Work out the cost of 20 litres of the mixed paint.

[4 marks]

Answer $ _____

14   The table shows the masses of three planets.

	Mass (kg)
Mars	6.42×10^{23}
Earth	5.98×10^{24}
Jupiter	1.90×10^{27}

14 (a)   How many times heavier is Jupiter than Earth?

[1 mark]

Answer _____

14 (b)   Work out the difference in masses between Earth and Mars.

Give your answer in standard form correct to 3 significant figures.
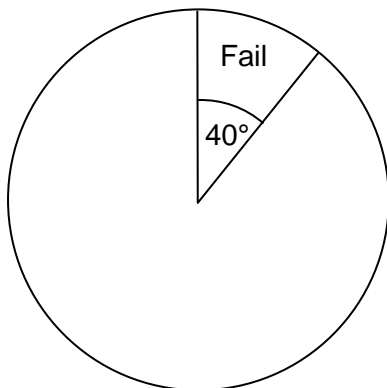
[2 marks]

Answer _____

15 Some students take a cycling test.

The percentage bar chart shows the results.
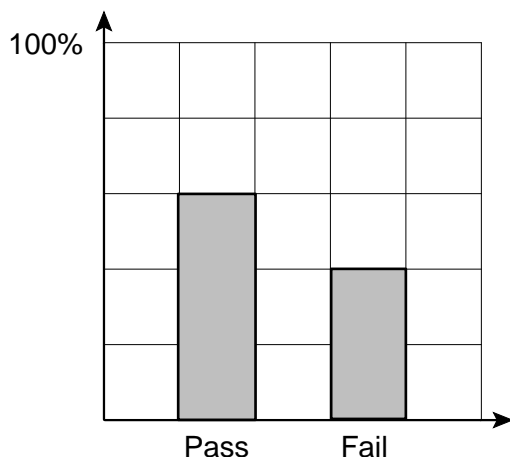
The students who fail the test take it a second time.

The pie chart shows these results.

Two students fail the second test.

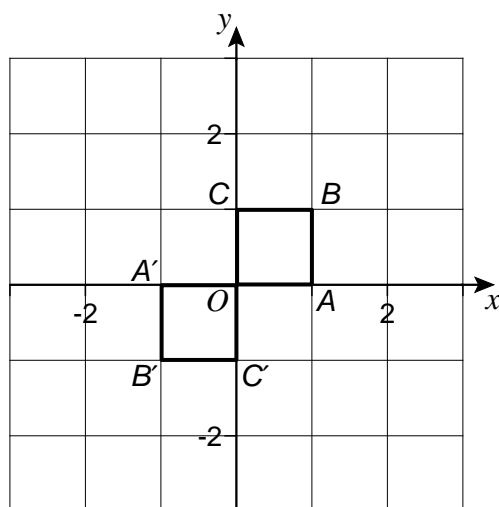How many students pass the test first time?

[4 marks]

Answer _____ students

16 The unit square $OABC$ has vertices

$O(0, 0)$ $A(1, 0)$ $B(1, 1)$ $C(0, 1)$

16 (a) $OABC$ is mapped to $OA'B'C'$ under the transformation matrix **M**.

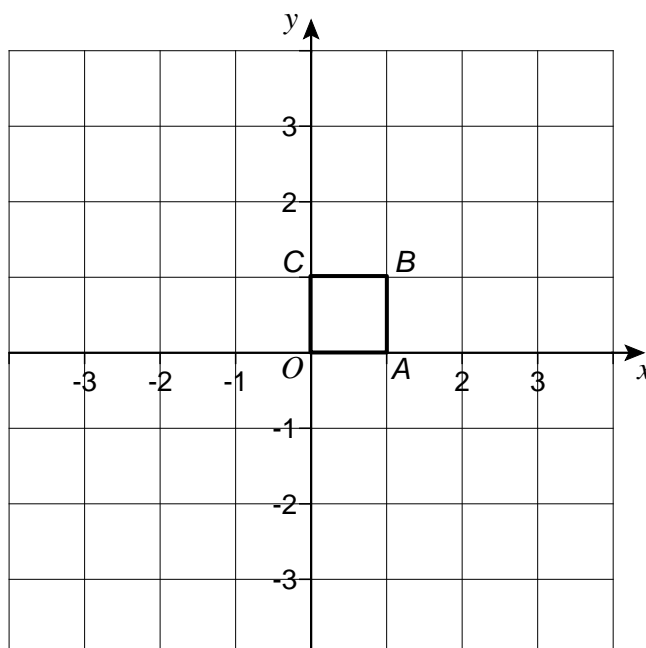Work out the matrix **M**.

[2 marks]

Answer _____

16 (b) $OABC$ is mapped to $OA''B''C''$ under the transformation matrix $\begin{pmatrix} -3 & 0 \\ 0 & -3 \end{pmatrix}$

Draw and label $OA''B''C''$ on the diagram below.

[3 marks]

Turn over for the next question

17 (a) Simplify fully $\dfrac{8c^7}{15d^6} \div \dfrac{6c^2}{15d^3}$
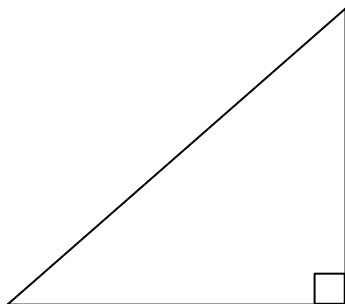
[3 marks]

Answer _____

17 (b) Write as a single fraction $\dfrac{5}{m+1} + \dfrac{6}{m-4}$

Give your answer in its simplest form.

[4 marks]

Answer _____

18 The area of a **right-angled, isosceles** triangle is 4 cm^2
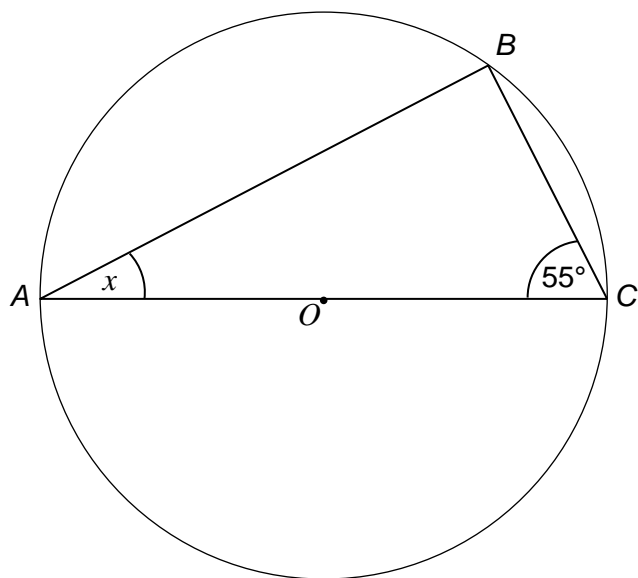
Not drawn
accurately

Work out the perimeter of the triangle in centimetres.

Give your answer in the form $a + b\sqrt{c}$, where a, b and c are integers.

[5 marks]

Answer _____ cm

19 (a) *A*, *B* and *C* are points on the circumference of a circle with centre *O*.
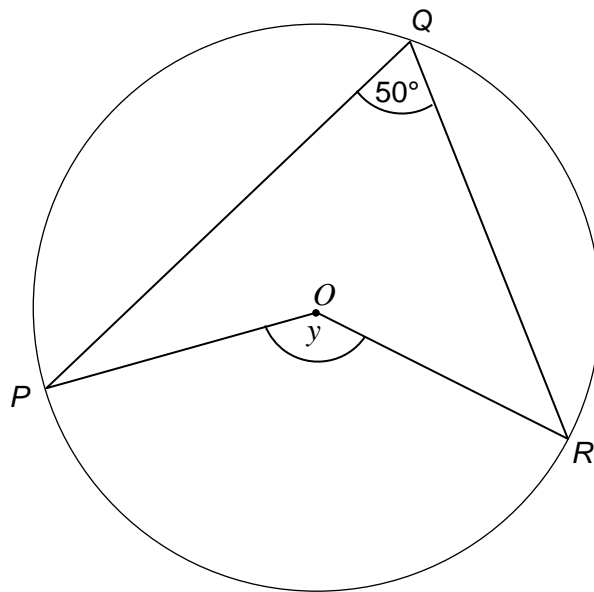
Not drawn accurately

Work out the size of angle *x*.

[1 mark]

Answer _____ degrees

19 (b) *P*, *Q* and *R* are points on the circumference of a circle with centre *O*.

Not drawn
accurately

Work out the size of angle *y*.
Give a reason for your answer.
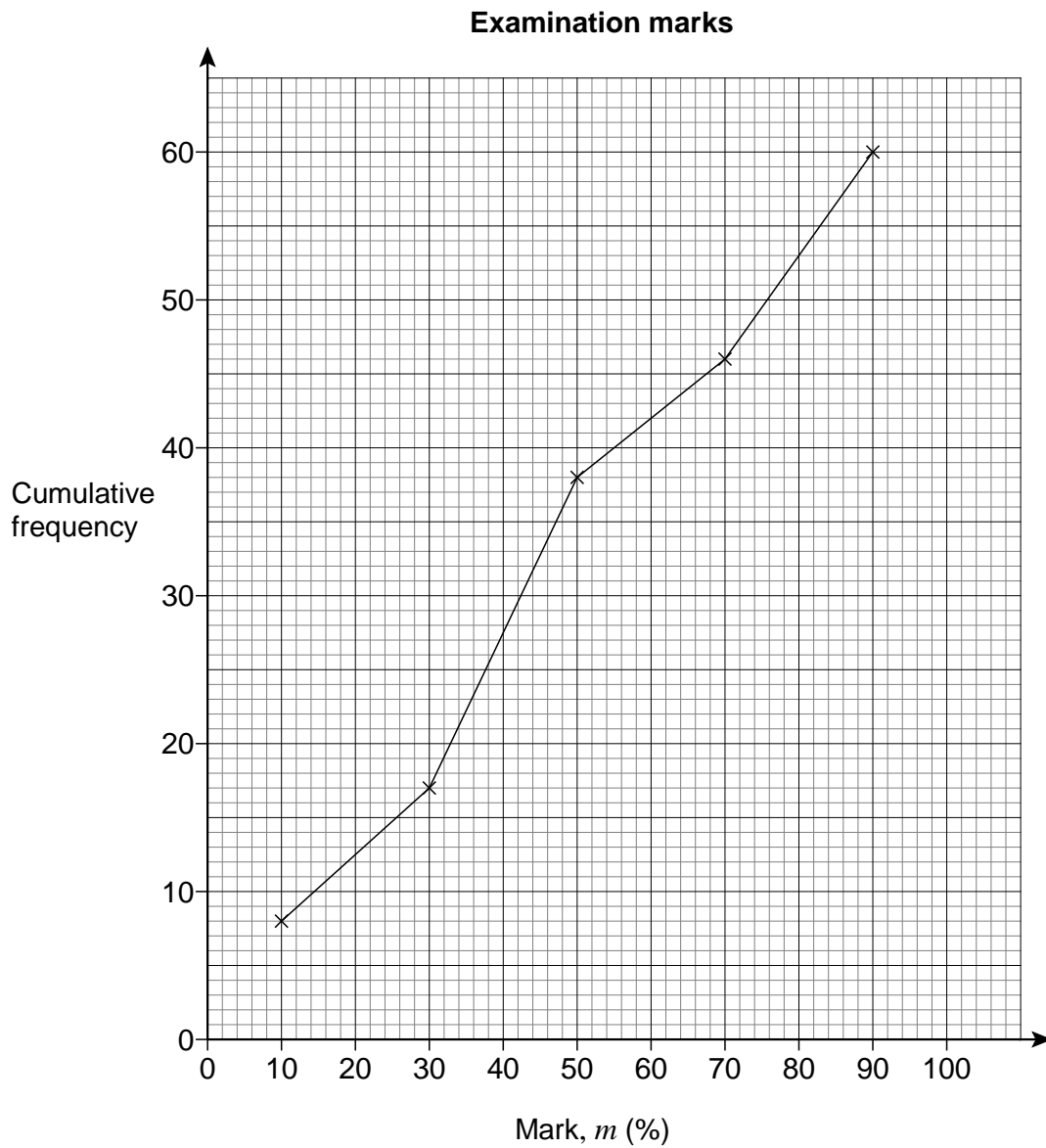
[2 marks]

Answer _____ degrees

Reason _____

20 Here are the examination marks for 60 pupils.

Mark, m (%)	Frequency
$0 \leqslant m < 20$	8
$20 \leqslant m < 40$	9
$40 \leqslant m < 60$	21
$60 \leqslant m < 80$	10
$80 \leqslant m < 100$	12

Molly drew this cumulative frequency graph to show the data.

Examination marks

Make **two** criticisms of Molly's graph.

[2 marks]

Criticism 1 _____

_____

_____

Criticism 2 _____

_____

_____

21 Which expression gives the area, in cm^2, of this triangle?

Not drawn accurately

8 cm

x

10 cm
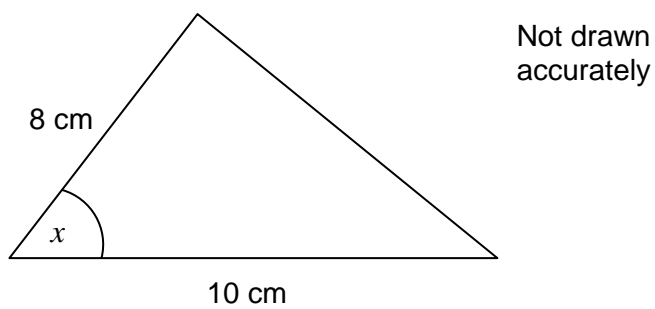
Circle your answer.

[1 mark]

80 sin x 40 sin x 80 cos x 40 cos x

22 The square of x is 7

Circle the value of x^3
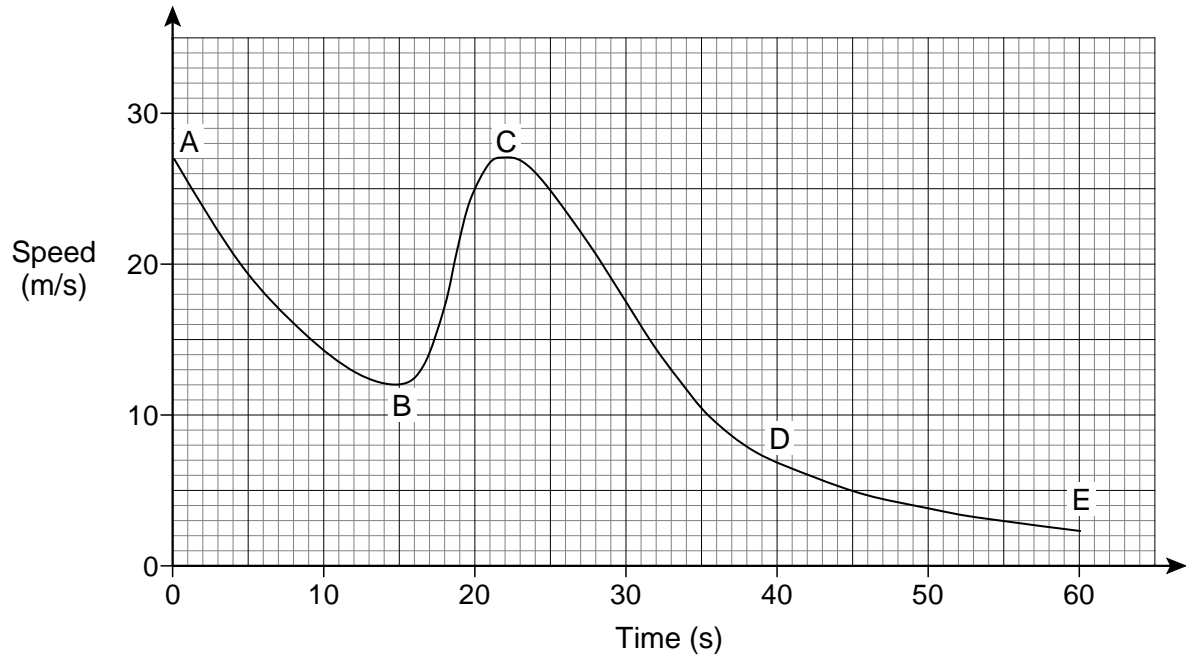
[1 mark]

343          $\sqrt[3]{49}$ 117 649 $7\sqrt{7}$

23 (a) The diagram shows the speed-time graph of a car for 60 seconds.

Which **two** points on the graph show when the car has an acceleration of zero?
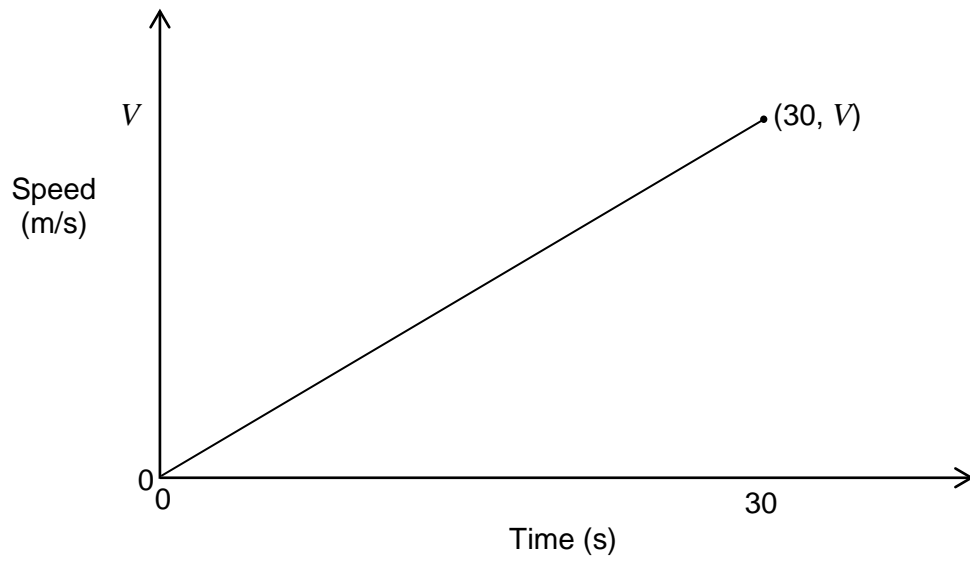
Circle your answers.

[1 mark]

A   B   C   D   E

23 (b) This diagram shows the speed-time graph of a lorry for 30 seconds.

After 30 seconds the speed of the lorry is V m/s

The lorry travels a distance of 270 metres in 30 seconds.

Work out V.

[2 marks]

$V = $ _____ m/s

24   Solve $x^2 + 6x + 2 = 0$

Give your answer in the form $a \pm \sqrt{b}$ where a and b are integers.

[4 marks]

Answer

25 Simplify $\dfrac{x^2 - 16}{2x^2 - 5x - 12}$

[3 marks]

Answer _____

26 Rationalise the denominator of $\dfrac{8}{3 - \sqrt{5}}$

Give your answer in the form $a + b\sqrt{5}$ where a and b are integers.

[3 marks]

Answer _____

Turn over ▶

27 A bag contains 9 counters.

4 of the counters are blue.

Two counters are taken out of the bag at random, without replacement.

Calculate the probability that **at least one** of the two counters is blue.
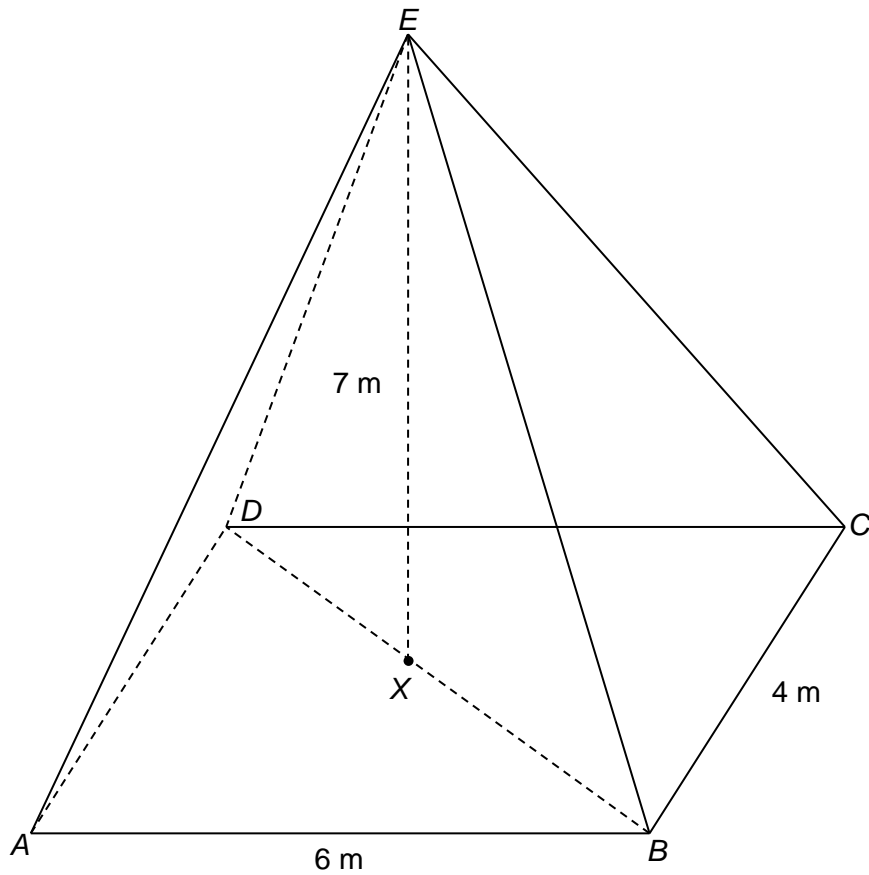
[4 marks]

Answer _____

28 A tent is in the shape of a pyramid with a horizontal rectangular base *ABCD*.

The vertex, *E*, is directly above *X*, the centre of the base.

The height of the pyramid is 7 m

Work out the size of the angle that *EB* makes with *ABCD*.
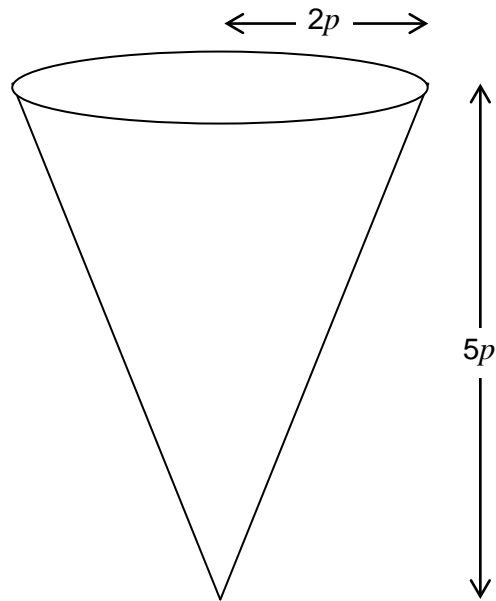
[4 marks]

Answer _____ degrees

29 This right circular cone has radius $2p$ and height $5p$.

The dimensions are in centimetres.

The volume of the cone is $22\,500\pi$ cm^3

Volume of a cone $= \dfrac{1}{3} \times$ area of base $\times$ perpendicular height

Work out the value of p.

[4 marks]

Answer $p =$ _____

30   Work out all of the solutions for x and y if $\begin{pmatrix} x & 3 \\ 1 & y \end{pmatrix} \begin{pmatrix} x \\ -4 \end{pmatrix} = \begin{pmatrix} 4x \\ 8 \end{pmatrix}$

[5 marks]

Answer _____

31 The curve $y = x^3 + bx + c$ has a stationary point at $(-2, 20)$

Work out the values of b and c.

[5 marks]

$b = \underline{\hspace{8cm}}$

$c = \underline{\hspace{8cm}}$

END OF QUESTIONS.

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