بسم الله الرحمن الرحيم

مقابل هذا المجهود ارجو منكم الدعاء لي بالمغفرة ولابنائي الهداية والنجاح والتوفيق

أرجو ان يساعد هذا المجهود على مساعدة ابنائنا طلبة ال IGCSE الثانوية البريطانية وتحصيلهم على افضل واحسن واعلى الدرجات انشاء الله.
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In the name of god

Pry for me and my sons to success, mitigating and proselyting

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IGCSE

Mathematics

Examination

PAPER 2

Good luck

(A)

June 1988 - Nov. 1995

UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATION SYNDICATE
INTERNATIONAL EXAMINATIONS

Mathematics

contents

Candidate Name .....

Centre Number	Candidate Number
	1

0580/2 IGCSE JUNE
0581/2 MATHEMATICS

PAPER 2

JUNE 1988 1 h 30 min

Additional materials provided by the Syndicate:
1. Mathematical tables

Additional materials provided by the school/candidate:
2. Electronic calculator 3. Geometrical instruments

International General Certificate of Secondary Education

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[Turn over

0580/2 MATHEMATICS

2

1 Work out $(17 + 28) + 3 - 2 \times 7$.

Answer ..... [1]

2 Express $\frac{7}{8}$ as a decimal.

Answer ..... [1]

3 Find the value of $27^{\frac{1}{3}}$

Answer ..... [1]

4 Find e^3, if $e = 2.71828$.
Write down your full calculator display.

Answer ..... [1]

5 

The diameter of a tennis ball is 6½ cm. Calculate its surface area, giving your answer correct to the nearest square centimetre.

[The surface area of a sphere of radius r is $4\pi r^2$. Take π as 3.142.]

Answer ..... cm² [2]

6 (a) Factorise completely

$$3x + 6ay + 2bx + 4aby.$$

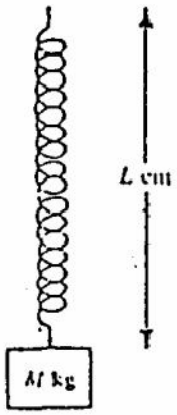
Answer (a) ..... [2]

(b) Solve the equation

$$3x^2 - 13x - 10 = 0.$$

Answer (b) $x =$ ..... or ..... [3]

---

7 

A spring is 60 cm long when unstretched. For every kilogram hung on the end of the spring, its length increases by 4 cm.

(a) Write down a formula connecting the extended length of the spring, L cm, with the mass, M kg.

Answer (a) ..... [1]

(b) If $M = 6$, find L.

Answer (b) $L =$ ..... [1]

(c) If $L = 100$, find M.

Answer (c) $M =$ ..... [1]

---

8 If Allison Taylor sells a coat in her shop for $120, she makes a profit of 25% on the cost price. Find the cost price of the coat. 4

Answer $ ..... [2]

---

9 The mass of the Earth is approximately 6×10^{24} kg, and the mass of the planet Jupiter is approximately 1.9×10^{27} kg.

By how many times is the mass of Jupiter greater than the mass of the Earth? Give your answer correct to two significant figures.

Answer ..... [2]

---

10 The mid-day temperatures during a week in January were:

$-3\,^{\circ}C,\ -2\,^{\circ}C,\ 2\,^{\circ}C,\ 4\,^{\circ}C,\ 0\,^{\circ}C,\ -3\,^{\circ}C,\ -5\,^{\circ}C.$

Find

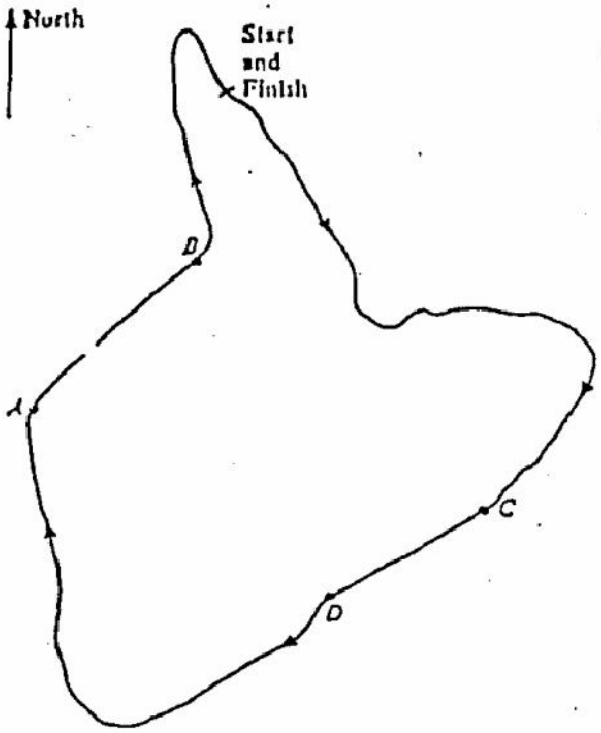
(*a*) the median mid-day temperature,

Answer (*a*) ..... °C [2]

(*b*) the mean mid-day temperature.

Answer (*b*) ..... °C [2]

11



The diagram is a scale drawing of the Spa motor racing circuit in Belgium.

The cars go round the circuit in the direction of the arrows.

On what three-figure bearing are the cars travelling

(a) between A and B.

Answer (a) ..... [2]

(b) between C and D?

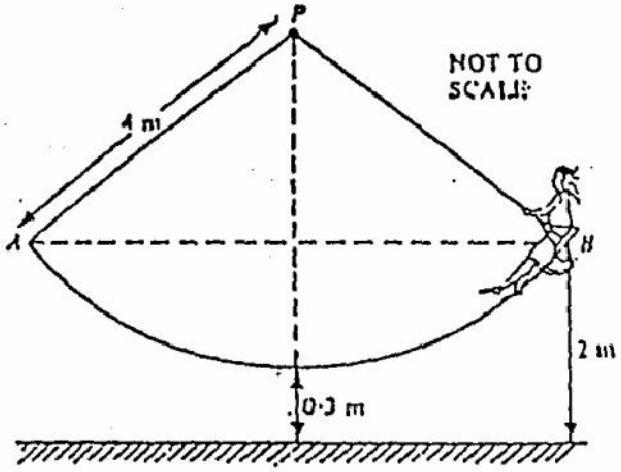
Answer (b) ..... [2]

---

12 A square metal plate is 1 mm thick and weighs 1504 g. The mass of 1 cm^3 of the metal is 9.4 g. Calculate the length of a side of the plate, giving your answer in centimetres.

Answer ..... cm [4]

13



The ropes of a swing are 4 metres long, and the seat is 30 cm above the ground when it is at its lowest point. When Roberta uses the swing, the seat reaches a height of 2 metres above the ground on each side of the vertical.

Calculate the angle $A\hat{P}B$ through which she swings.

Answer ..... [4]

---

14 Louise Grant works for five days each week. She starts work at 08 30, has a lunch break of one hour (for which she is not paid) and finishes at 17 00.

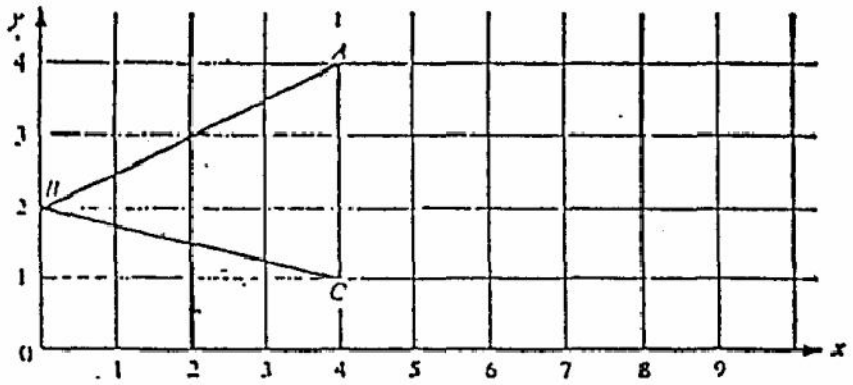
(*a*) How many hours does she work each week?

Answer (*a*) ..... hours. [2]

(*b*) Her rate of pay is $6.40 an hour. Calculate her weekly wage.

Answer (*b*) $ ..... [1]

15



(*a*) Find the area of triangle ABC.

Answer (*a*) ..... cm² [1]

(*b*) D is the reflection of B in the line AC. Mark the point D on your diagram, and write down its coordinates.

Answer (*b*) ( ) [1]

(*c*) Write down .

(i) the equation of the line AC,

Answer (*c*) (i) ..... [1]

(ii) the equation of the line AB.

Answer (*c*) (ii) ..... [2]

(*d*) Write down the coordinates of the point at which AB produced meets the x-axis.

Answer (*d*) ( ) [1]

8

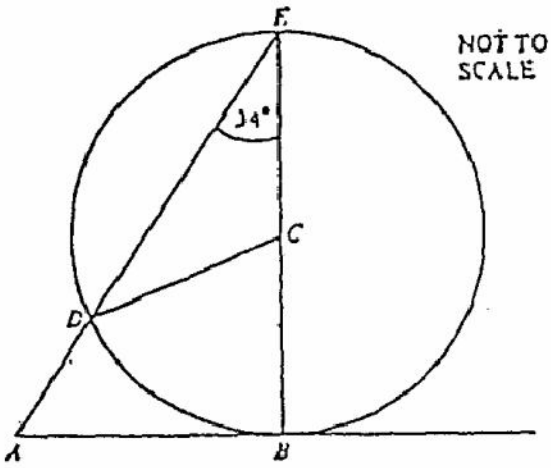
16. Express

$$\frac{2}{x+2} - \frac{x}{x+1}$$

as a single fraction in its simplest form.

Answer ..... [4]

17



NOT TO SCALE

In the diagram, C is the centre of the circle and AB is a tangent.

Find all the angles of the quadrilateral $ABCD$.

Answer $A\hat{B}C$ = ...

$B\hat{A}D$ = ...

$B\hat{C}D$ = ...

$C\hat{D}A$ = ... [4]

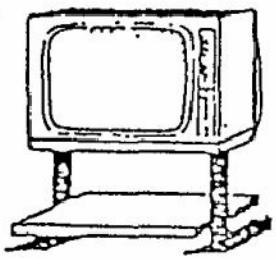
18 Given that $a + b = x$ and $a - b = y$, prove that

$$x^2 + y^2 = 2(a^2 + b^2).$$

Proof:

[4]

19



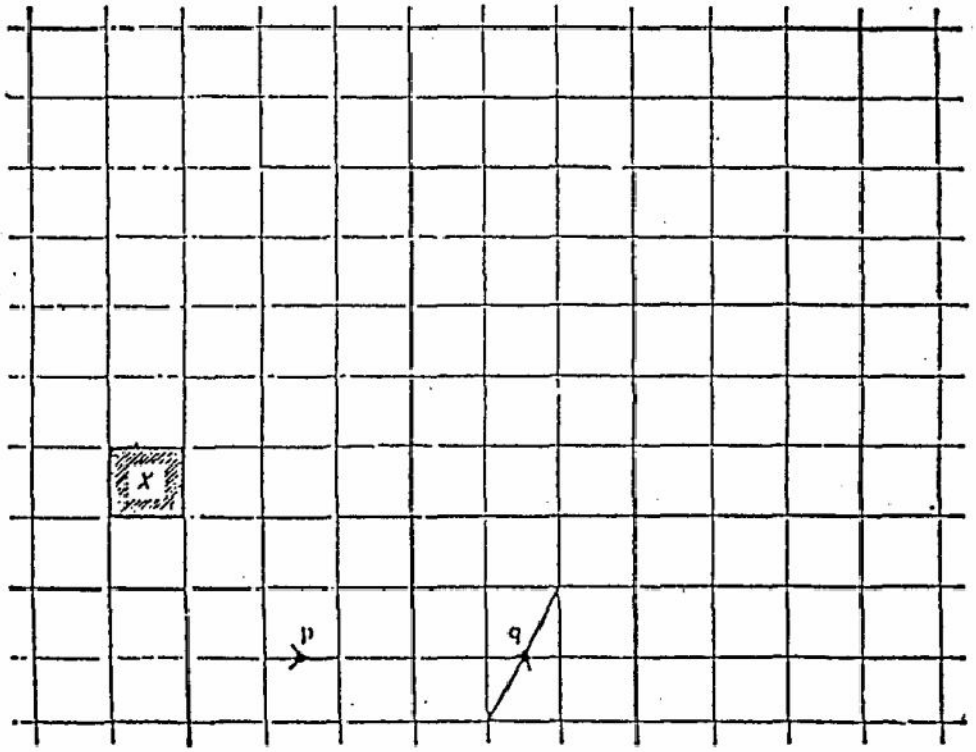
NOT TO SCALE

The ratio of the height of a television screen to its width is 3 to 4. Find the height and width of a screen with a diagonal of length 60 cm.

Answer Height ..... cm

Width ..... cm [4]

20



The vectors p and q are shown in the diagram.

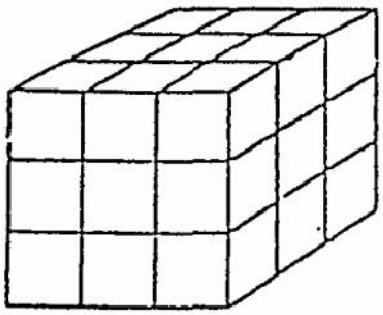
Draw the new position of the square X' after

(a) the translation 5p, [1]

(b) the translation 3p + 2q. [2]

21 The 240 pupils in a school all study Geography, or History, or both.
Twice as many pupils study Geography as History.
25% study both.
How many study only Geography?

Answer ..... [3]

22 

Fred Carpenter takes a cube with edges 12 cm long and paints all six faces green.

He then cuts it into cubes with edges 4 cm long.

(*a*) How many 4 cm cubes are there?

Answer (*a*) ..... [1]

(*b*) How many of these 4 cm cubes have

(i) 3 green faces;

Answer (*b*) (i) ..... [1]

(ii) 2 green faces;

Answer (*b*) (ii) ..... [1]

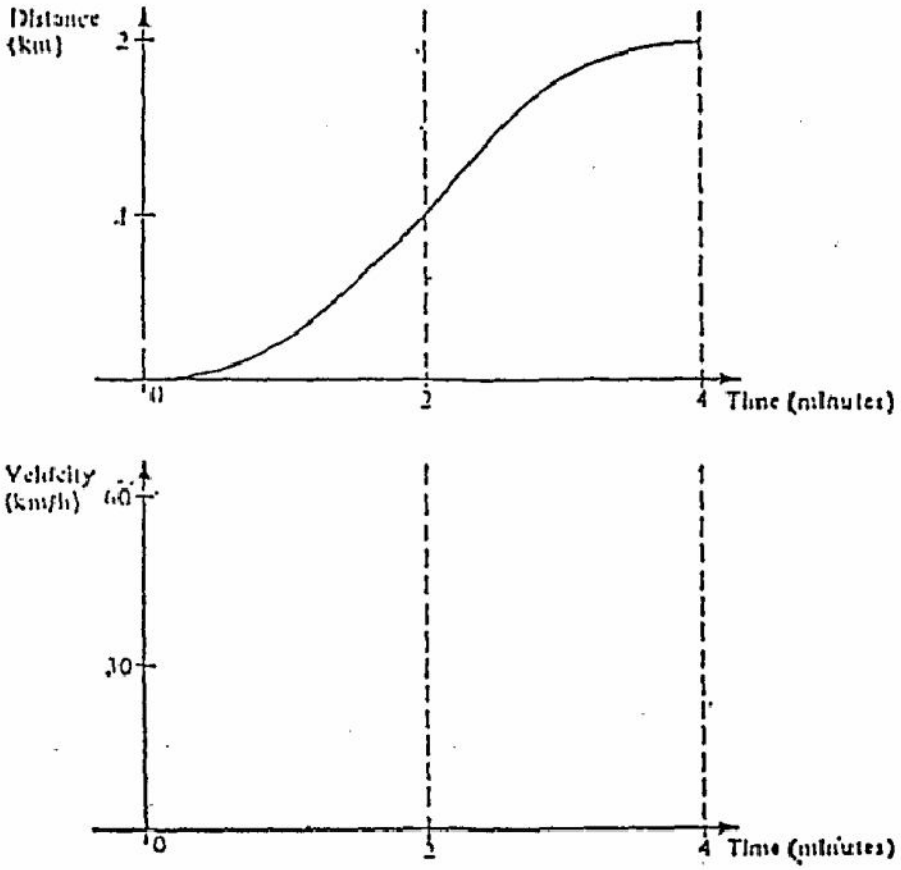
(iii) 1 green face,

Answer (*b*) (iii) ..... [1]

(iv) no green faces?

Answer (*b*) (iv) ..... [1]

23



The upper diagram is the distance-time graph of a short car journey.

The greatest speed reached is 60 km/h; the acceleration and retardation are constant.

(*a*) Draw the corresponding velocity-time graph on the lower diagram. [3]

(*b*) What is the average speed for the whole journey, in kilometres per hour?

Answer (*b*) ..... km/h [2]

Centre Number | Candidate Number

Candidate Name .....

12

0580/2
0581/2

IGCSE
MATHEMATICS
PAPER 2
NOVEMBER 1988

1 h 30 min

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Three figure accuracy is required in your answers except where stated otherwise.

The total of the marks for this paper is 70.

The number of marks available is shown in brackets [ ] after each question or part question.

0580/2

MATHEMATICS

PAPER 2

1 h 30 min

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Three figure accuracy is required in your answers except where stated otherwise.

The total of the marks for this paper is 75.

The intended marks for questions or parts of questions are given in brackets [ ].

1 Find $\sqrt{\frac{4}{9}}$.

Answer ..... [1]

---

2 Find 73% of (40 × 52.65).

Answer $ ..... [1]

---

3. How many minutes are there between 18 25 and midnight?

Answer ..... [1]

14

4 Find the value of $5ab$, when $a = 3 \times 10^4$ and $b = 8 \times 10^{-7}$. Give your answer in Standard Form.

Answer .... [2]

---

5 Find the value of $27^{\frac{1}{3}} \times 49^{\frac{1}{2}} \times 5^0$.

Answer .... [2]

---

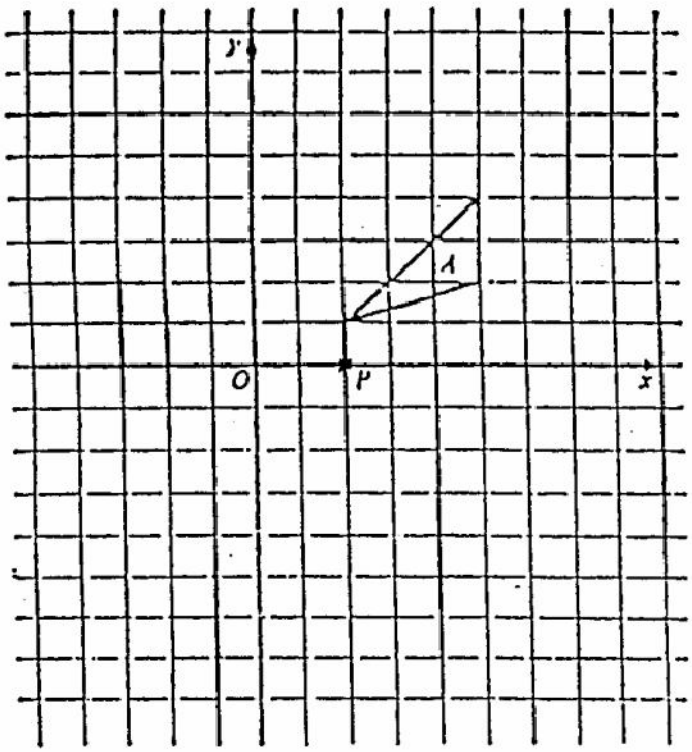
6 (*a*) What is the gradient of the line $y = 5 - 2x$?

Answer (*a*) .... [1]

(*b*) Find $\{(x, y): y = 5 - 2x\} \cap \{(x, y): x = 4\}$.

Answer (*b*) {( )} [2]

7



(a) On the diagram, enlarge triangle A with centre of enlargement P and scale factor -2. [2]

(b) The area of triangle A is 3 square units. What is the area of the enlarged triangle?

Answer (b) .... sq. units [2]

---

8 A hat of size N in Britain is equivalent to a hat of size C in the rest of Europe.

(a) $C = 56$ when $N = 6\frac{7}{8}$. Find the value of $8N$.

Answer (a) .... [1]

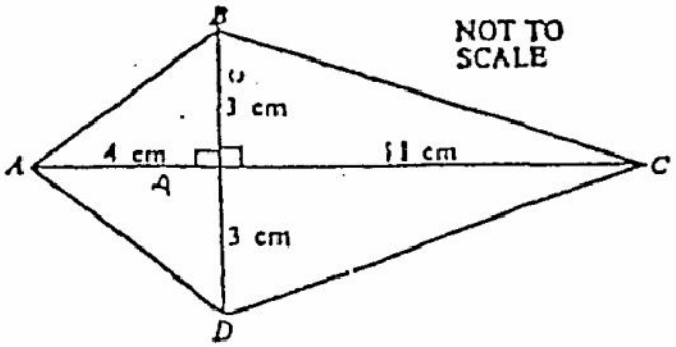
(b) $C = 60$ when $N = 7\frac{1}{2}$. Find the value of $8N$.

Answer (b) .... [1]

(c) Write down a formula connecting C and N.

Answer (c) ..... [1]

9



AC is perpendicular to BD.

(a) Calculate the lengths of the sides of the quadrilateral $ABCD$.

Answers (a) AB = ... cm

BC = ... cm

CD = ... cm

AD = ... cm [3]

(b) Calculate the size of angle BCD.

Answer (b) $B\hat{C}D$ = ... [2]

---

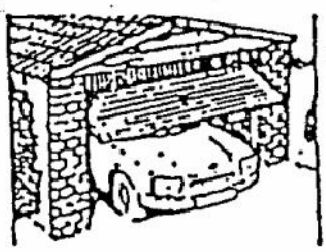
10 y varies inversely as x.

(a) Write this statement as an equation in x, y and k, where k is a constant.

Answer (a) ..... [1]

(b) If x increases by 25%, find the percentage change in y.

Answer (b) ..... % [3]

11 

To the nearest metre, a garage is 5 metres long and 3 metres wide.

(a) The actual length of the garage is l metres. Write down the upper and lower limits of l.

Answer (a) ..... $\leqslant l <$ ..... [1]

(b) The actual area of the garage floor is A square metres. Calculate the upper and lower limits of A.

Answer (b) ..... $\leqslant A <$ ..... [2]

12 A car wheel has a radius of 30 centimetres. How many times does it revolve during a journey of 200 kilometres? Give your answer to the nearest thousand. [Take π to be 3.142]

Answer ..... [3]

13 It is given that

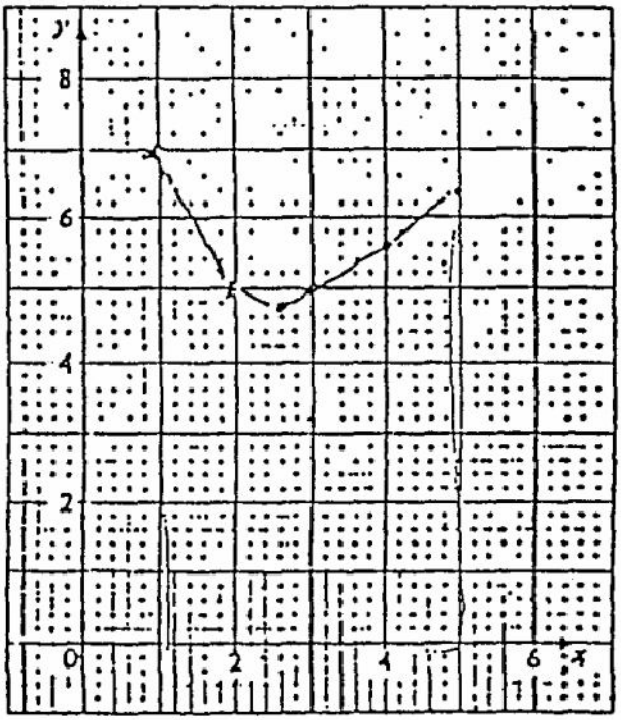
$$y = \frac{6}{x} + x.$$

(a) Complete the following table.

x	1	2	2.5	3	4	5
y	7	5	4.9	5	5.5	6.2

[2]

(b) Plot the points on the axes below, and join them up with a smooth curve.



[2]

(c) Estimate the area between the curve, the x-axis, and the lines $x = 1$ and $x = 5$. Give your answer in square centimetres.

Answer (c) .... cm^2 [2]

---

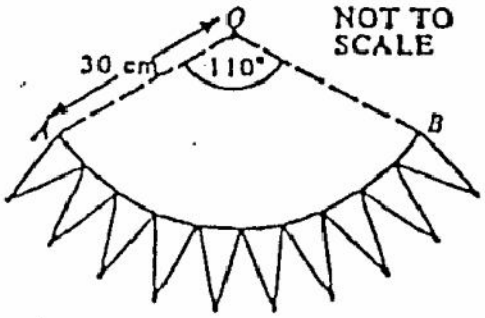
14 For what range of values of x is

$$3x + 8 \geq 26?$$

Answer ..... [3]

---

15 A string hangs in an arc of a circle, centre O, of radius 30 cm. Ten identical flags are attached to the string, as shown in the diagram.



(a) Calculate the length of the arc AB. [Take π to be 3.142.]

Answer (a) ..... cm [2]

(b) Use your answer to part (a) to find the approximate length of the shortest side of one of the flags. Give your answer correct to one decimal place.

Answer (b) ..... cm [1]

(c) The equal sides of each flag are 8 centimetres long. Taking the base of each flag as a straight line, make a full-sized drawing of one flag, using ruler and compasses only.

[2]

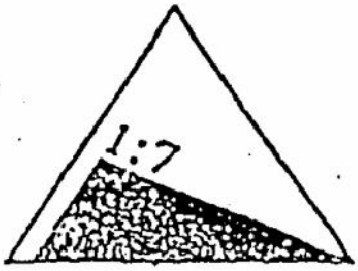
16 Solve the simultaneous equations

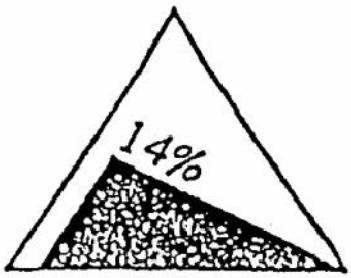
$$2x + y = 15,$$
$$5x - 2y = 6.$$

Answer $x =$ .....

$y =$ ..... [3]

17





Twenty years ago, the road sign on the left stood at the top of a steep hill. It was then replaced by the road sign on the right.

(a) Explain why the two signs are equivalent.

Answer (a) ....

.... [1]

(b) If the old sign had been 1 : 9, what would the percentage on the newer sign be?

Answer (b) ....% [1]

---

18 (a) Use your calculator to change the following fractions to decimals. Show your full calculator display.

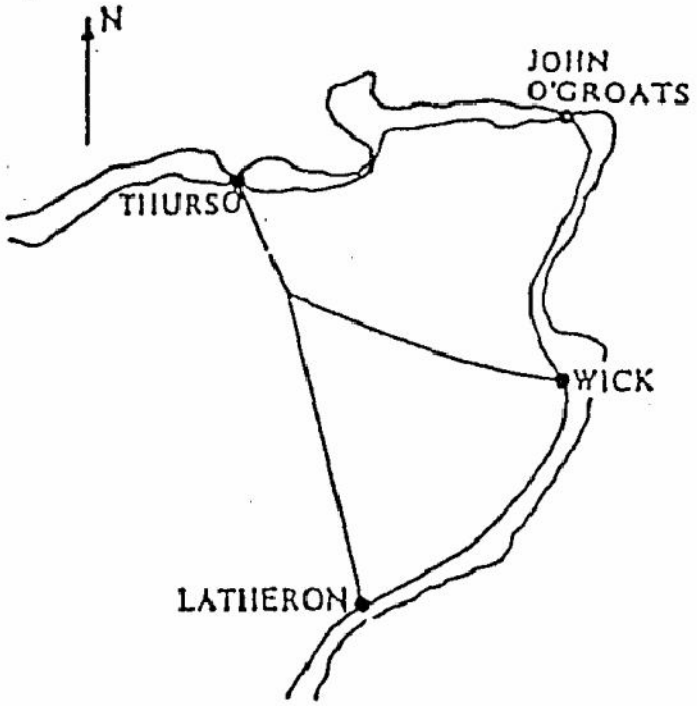
$\frac{5}{9}$ $\frac{18}{31}$ $\frac{4}{7}$

Answers (a) $\frac{5}{9}$ = $\frac{18}{31}$ = ... $\frac{4}{7}$ = ...[1]

(b) Which one of the above fractions is nearest in value to $\frac{1}{\sqrt{3}}$?

Answer (b) ....[1]

19



The map shows the main roads in Caithness, Scotland. The scale of the map is 1 : 600 000.

(a) Use your protractor to find the bearing of Wick from Thurso.

Answer (a) ..... [1]

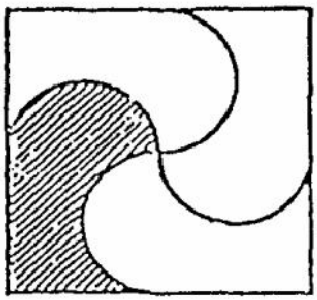
(b) What is the bearing of John O'Groats from Wick?

Answer (b) ..... [1]

(c) Find the shortest distance in kilometres by road from Thurso to Latheron.

Answer (c) .... km [1]

20



The diagram is drawn accurately.

(a) Calculate the shaded area.

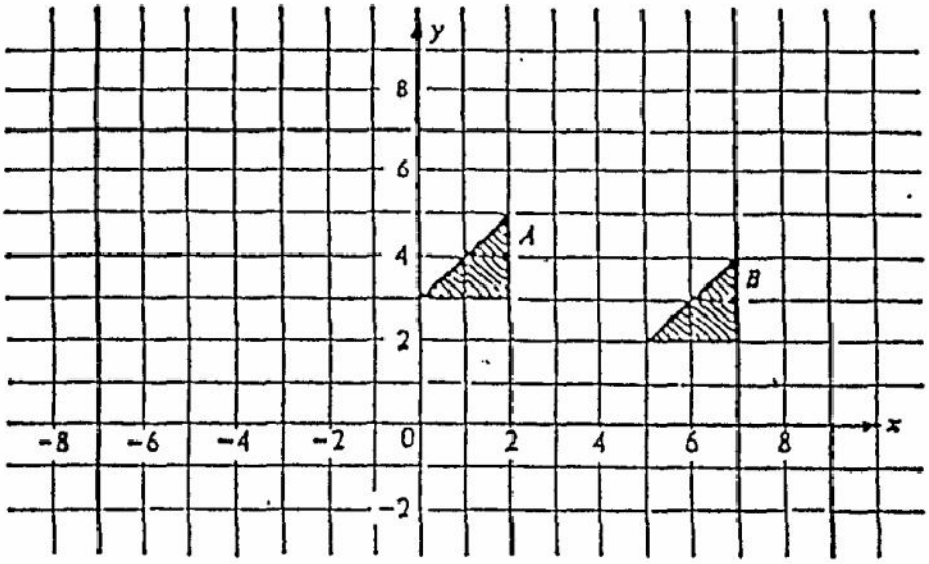
Answer (a) .... cm^2 [1]

(b) Explain how you have obtained your answer to (a).

Answer (b) .....

..... [1]

21



(a) Write down the vector of the translation which will map flag A on to flag B.

Answer (a) ( ) [1]

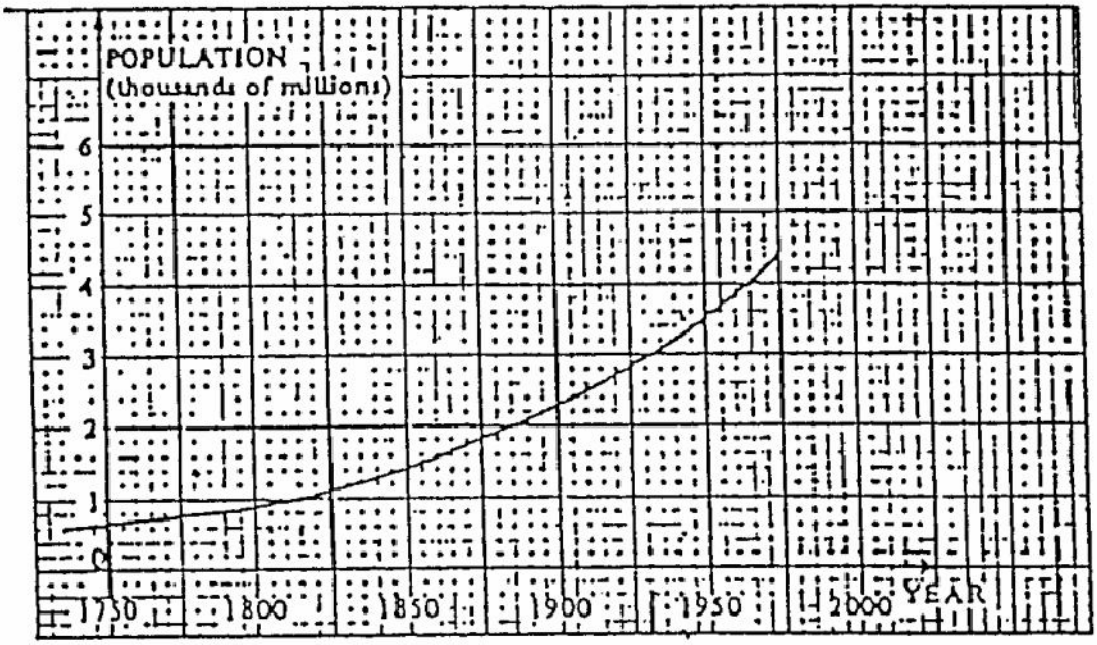
(b) Flag A is rotated anticlockwise through 90° about the point $(-2, 3)$. Draw the rotated flag, and label it C. [1]

(c) Describe fully the rotation that will map flag C on to flag B.

Answer (c) .....

..... [2]

22 The graph shows the population of the world, in thousands of millions, from 1750 to 1975.



Give all your answers correct to two significant figures.

(a) Read off the world population in 1950.

Write down your answer (i) in words or figures,
(ii) in Standard Form.

Answer (a) (i) ..... [1]

(ii) ..... [1]

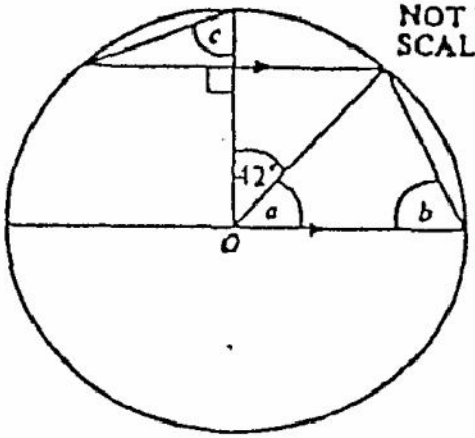
(b) By drawing a suitable tangent, estimate the rate of population growth in 1900.

Answer (b) ..... millions per year. [2]

(c) Assuming that present trends continue, estimate the population of the world in the year 2000.

Answer (c) ..... [2]

23



In the diagram, O is the centre of the circle.

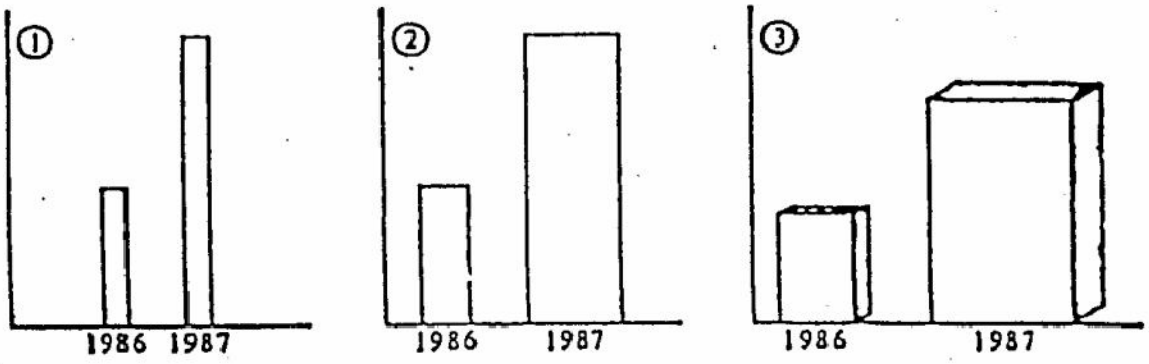
Find angles a, b and c.

Answer Angle a = ... [1]

Answer Angle b = ... [2]

Answer Angle c = ... [2]

24 In 1987, twice as many books were borrowed from the School Library as in 1986. The School Librarian draws three possible diagrams, shown below:



(a) Which diagram shows the information most fairly?

Answer (a) Diagram .... [1]

(b) What do the other two diagrams imply about the ratio

$$\frac{\text{Number of books borrowed in 1987}}{\text{Number of books borrowed in 1986}}?$$

Answer (b)

Diagram	Ratio
	:1
	:1

[2]

Centre Number | Candidate Number | 27

Candidate Name .....

0580/2
0581/2

IGCSE JUNE MATHEMATICS

PAPER 2

JUNE 1989 1 h 30 min

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 ank page.

28

For the use of the Examiner

1 Write down the next term in the sequence

16, 25, 36, 49, 64, ...

Answer ..... [1]

2 Evaluate

$$\frac{6.3 - 5.7}{6.3 + 5.7}.$$

Answer ..... [1]

3 Find, correct to 2 decimal places, the value of x such that

$$x = \frac{1}{3.5} + \frac{1}{5.9}.$$

Answer $x =$ ..... [1]

4 It is given that $\mathscr{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$,
$A = \{1, 3, 5, 6, 9\}$ and
$B = \{3, 4, 5, 6\}$.

Find $n(A \cap B)$.

Answer $n(A \cap B) =$ ..... [1]

5 The lengths of the sides of two cubes are 3 centimetres and 5 centimetres.

Find the value of the fraction

$$\frac{\text{Volume of smaller cube}}{\text{Volume of larger cube}}.$$

Answer ..... [1]

---

6 Factorise completely

$$6x^2 - 9x - 27.$$

Answer ..... [2]

---

7 Solve the simultaneous equations

$$2x + 3y = 21,$$
$$3x - 4y = -11.$$

Answer $x =$ .....

$y =$ ..... [3]

---

8 Write down five different positive integers whose median is 8 and whose mean is 6.

Answer ..... [3]

---

9 A car travels at a constant speed of d kilometres per hour. Write down, and simplify, an expression for the time taken, in minutes, to travel a distance of h metres.

Answer ..... minutes [3]

---

10 The value of z is 0.3, correct to one decimal place.

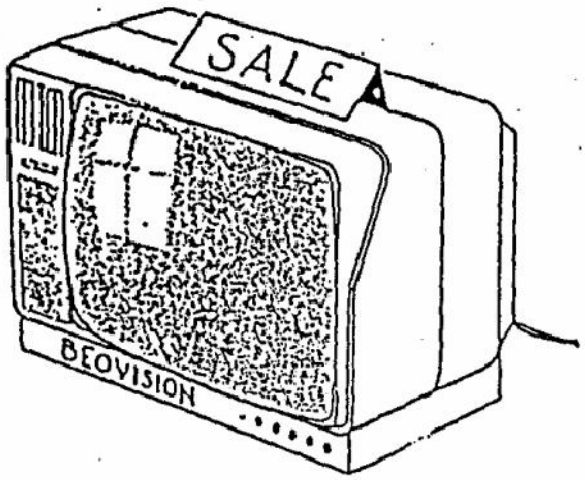
(*a*) Between what limits must the value of z lie?

Answer (*a*) ..... $\leqslant z <$ ..... [2]

(*b*) Calculate the greatest possible value of $\frac{1}{z}$.

Answer (*b*) ..... [1]

For the of th Exam

11 

In a sale the price of a television set is reduced by 15% to $340. Find the original price of the television set.

Answer $ ..... [3]

12 Given that

$$T = 2\pi\sqrt{\frac{l}{g}},$$

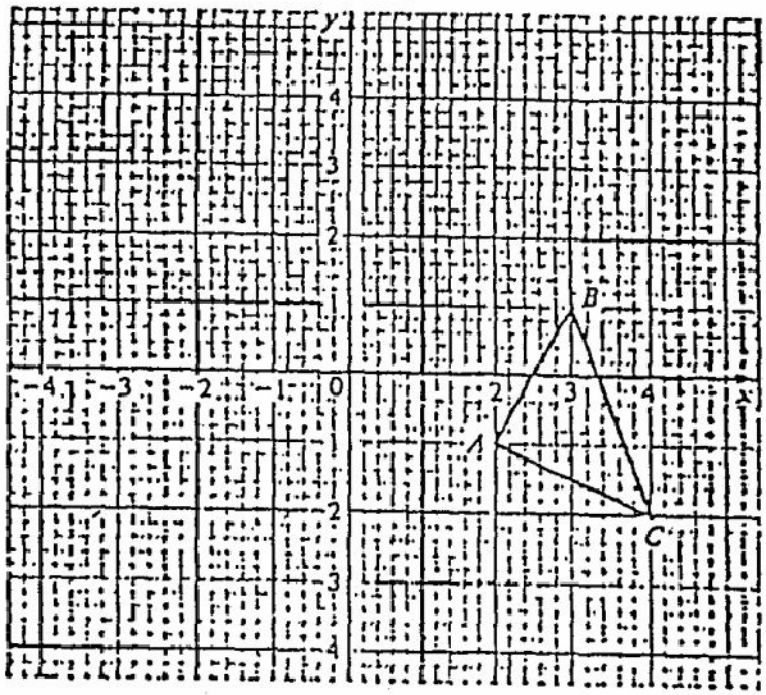
rearrange the formula to express g in terms of T, π and l.

Answer $g =$ ..... [3]

13 Find the inverse of $\begin{pmatrix} 3 & 4 \\ -1 & 2 \end{pmatrix}$.

Answer ( ) [3]

14



The triangle ABC, in the diagram above, is mapped onto triangle $A_1B_1C_1$ by an anticlockwise rotation, through 90°, centre the origin.

Draw this new triangle $A_1B_1C_1$ labelling each vertex clearly. [3]

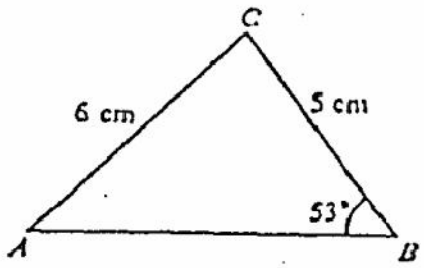
15 y varies directly as x^2 and $y = 96$ when $x = 4$. Obtain an expression for y in terms of x.

Answer $y =$ ..... [3]

16 Two dice are thrown together. Calculate the probability that there will be at least one six.

Answer ..... [3]

17



NOT TO SCALE

In the triangle ABC above, $AC = 6$ centimetres, $BC = 5$ centimetres and $A\hat{B}C = 53°$. Calculate $B\hat{A}C$.

Answer $B\hat{A}C =$ ..... [3]

32

For the use of the Examiner

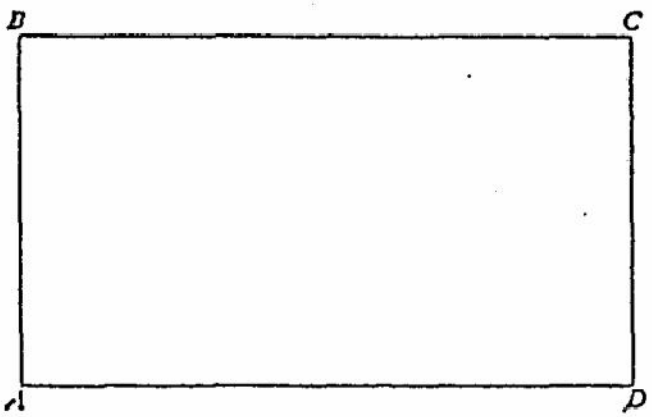
18 Solve the quadratic equation

$$x^2 + 3x - 5 = 0,$$

giving your answers correct to 2 decimal places.

Answer $x =$ ..... or ..... [4]

19



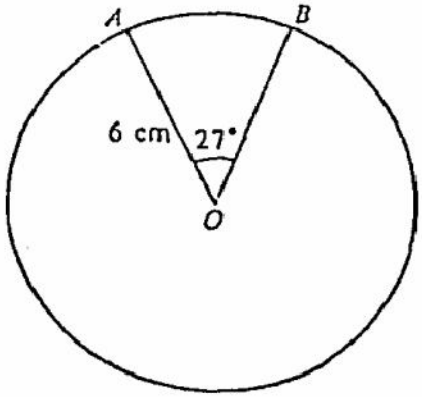
Inside the rectangle $ABCD$,

(*a*) draw the locus of points which are 5 centimetres from D, [1]

(*b*) draw the locus of points which are the same distance from the lines AB and DC, [1]

(*c*) shade the region where the points are more than 5 centimetres from D and nearer to the line DC than to AB. [2]

20



NOT TO SCALE

In the diagram above angle AOB is 27° and the radius of the circle, centre O, is 6 centimetres. (π is approximately 3.142.)

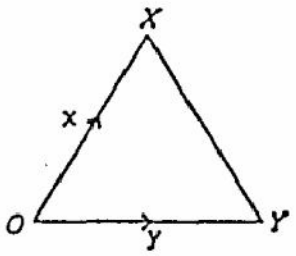
(*a*) Calculate the length of the minor arc AB.

Answer (*a*) ..... cm [2]

(*b*) Calculate the area of the major sector.

Answer (*b*) ..... cm² [2]

21



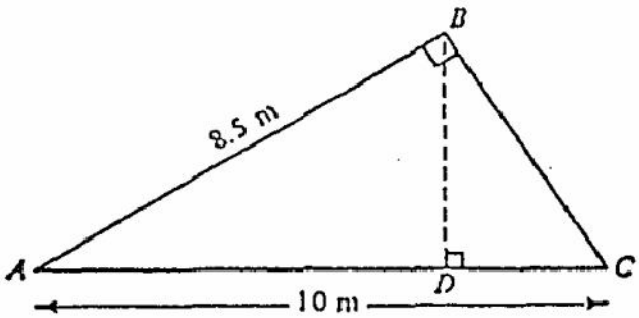
In the diagram above OXY is an equilateral triangle with vectors $\vec{OX} = \mathbf{x}$ and $\vec{OY} = \mathbf{y}$.
Draw accurately on the diagram the vectors $\vec{OA}$ and $\vec{OB}$ such that

(a) $\vec{OA} = \mathbf{x} + \mathbf{y}$,

(b) $\vec{OB} = 2\mathbf{x} - \mathbf{y}$.

[4]

22



NOT TO SCALE

The diagram above shows the cross-section of a factory roof. Given that $AB = 8.5$ metres, $AC = 10$ metres and angle ABC = angle $BDC = 90°$, calculate

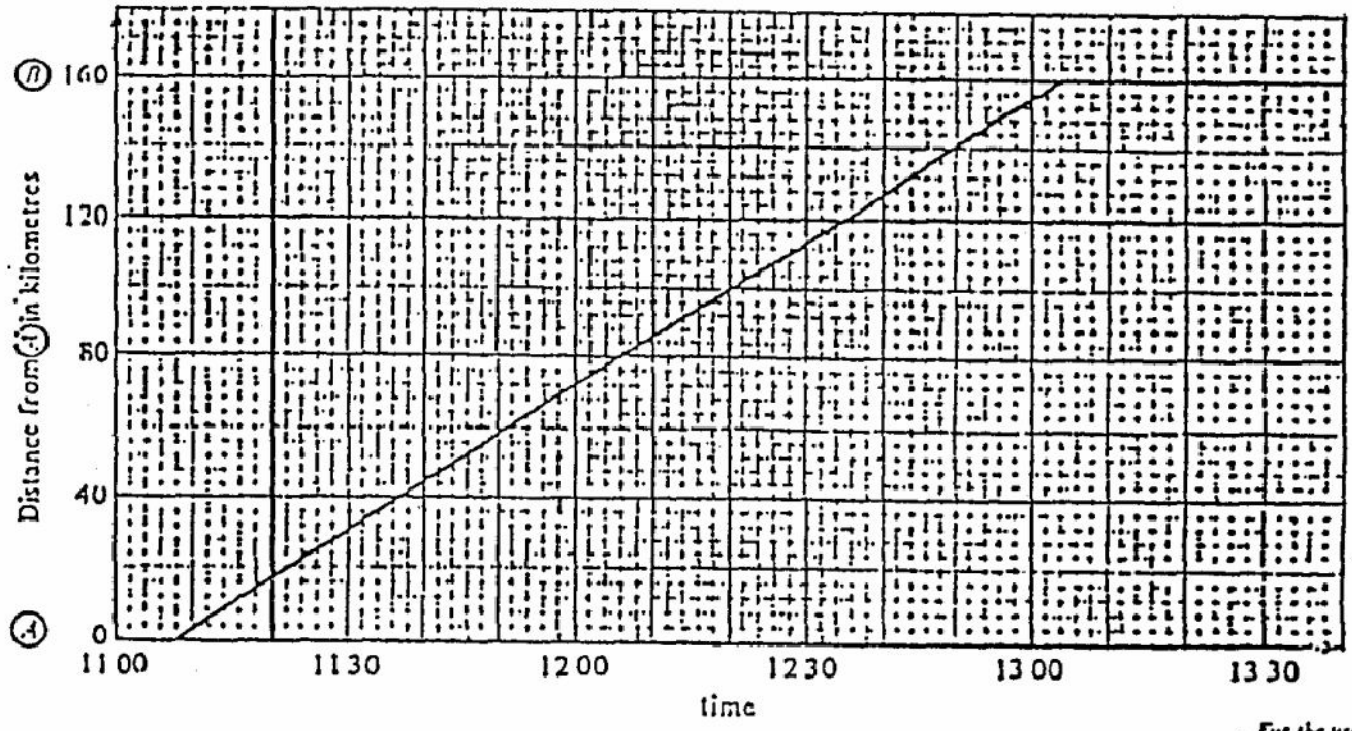
(a) the length of BC,

Answer (a) ..... m [2]

(b) the length of BD.

Answer (b) ..... m [2]

23



For the use of the Examiner

The graph above shows two autobahn stops, A and B, 160 kilometres apart. The line on the graph represents the journey of a car which leaves A at 11 08 and is driven to B, without stopping, at a constant speed. It arrives at B at 13 04.

(*a*) Calculate the average speed of the car for this journey.

Answer (*a*) ..... km/h [2]

(*b*) A second car arrives at A at 13 24, having been driven from B at a constant speed of 80 kilometres per hour.

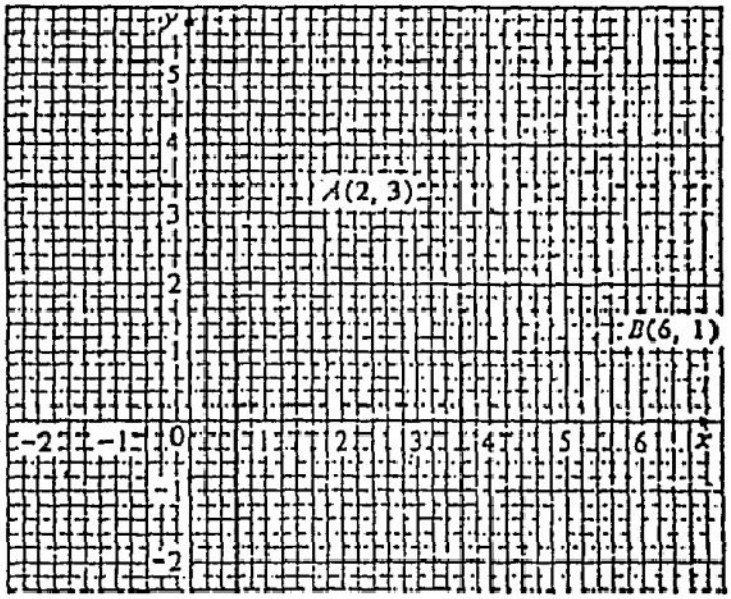
(i) Draw the graph of this journey on the diagram above. [2]

(ii) How far from B are the two cars when they pass one another?

..... km [1]

35

24



In the diagram above, A is the point (2, 3) and B is the point (6, 1).

(a) Calculate the gradient of the straight line passing through A and B.

Answer (a) ..... [2]

(b) Write down the coordinates of the point where the line crosses the y-axis.

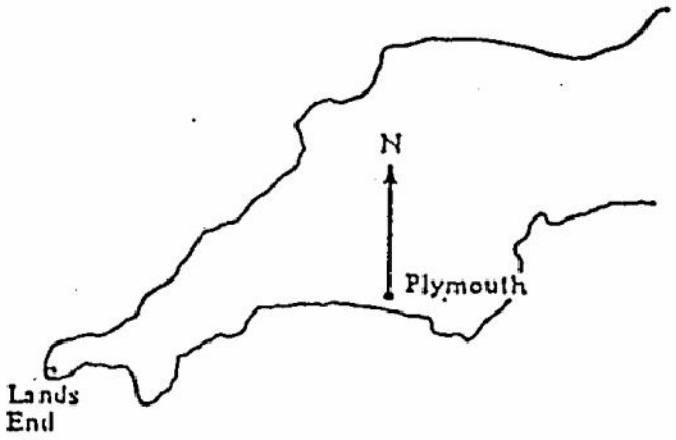
Answer (b) ( ) [1]

(c) Find the equation of the line.

Answer (c) ..... [2]

For the use of the Examiner

25



The map above is of Devon and Cornwall.

The direct distance from Plymouth to Lands End is 115 kilometres.

(*a*) Giving both answers correct to 2 significant figures,

(i) calculate the distance, in kilometres, represented by 1 centimetre on the map.

Answer (*a*) (i) ..... km [1]

(ii) write down the scale of the map in the form 1 : *n*.

Answer (*a*) (ii) 1 : ..... [1]

(*b*) On a windless day a helicopter sets off from Plymouth at 08 00 to fly to Lands End. Its average speed for the journey is 50 kilometres per hour.

(i) On what bearing should the helicopter fly?

Answer (*b*) (i) ..... [1]

(ii) At what time would the helicopter arrive at Lands End?

Answer (*b*) (ii) ..... [2]

Centre Number

Candidate Name .....

37.

0580/2
0581/2

IGCSE
MATHEMATICS
PAPER 2

NOVEMBER 1989 1 h 30 min

Additional materials provided by the Syndicate:
1. Mathematical tables

Additional materials provided by the school/candidate:
2. Electronic calculator 3. Geometrical Instruments

UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

Instructions to candidates:

Write your name and examination number in the spaces provided at the top of this page.

You should answer all *the questions in the spaces provided on the question paper.*

If working is needed for any question it must be shown in the space below that question,

Electronic calculators should be used.

Three figure accuracy is required in your answers except where stated otherwise.

The total of the marks for this paper is 70.

The number of marks available is shown in brackets [ ] after each question or part question.

This Question Paper consists of 11 printed pages and 1 blank page.

[Turn over

1 Simplify $\frac{2x}{3} + \frac{x}{12}$.

Answer ..... [2]

---

2 Find the value of

(*a*) $64^{\frac{1}{3}}$.

Answer (*a*) ..... [1]

(*b*) 3^{-2}

Answer (*b*) ..... [1]

---

3 Simplify $3\begin{pmatrix} -2 & 1 \\ 0 & 2 \end{pmatrix} - 4\begin{pmatrix} 1 & 0 \\ 2 & -5 \end{pmatrix}$

Answer $\begin{pmatrix} & \\ & \end{pmatrix}$ [2]

---

4 $\mathscr{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$,
$B = \{3, 4, 5, 7, 8\}$,
$A \cap B = \{3, 5, 7\}$,
$A \cup B = \{1, 2, 3, 4, 5, 7, 8\}$.

List the elements of set A.

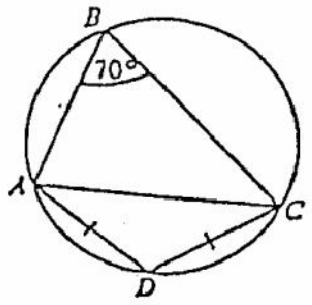
Answer { } [2]

---

5 Given that $3 \leqslant a \leqslant 7$ and $18 \leqslant b \leqslant 42$, find the greatest value of $\frac{b}{a}$.

Answer ..... [2]

6



NOT TO SCALE

In the diagram above A, B, C and D are points on the circumference of a circle.
Angle $ABC = 70°$ and $AD = DC$.
Calculate angle DAC.

Answer Angle DAC = ... [2]

---

7 Factorise $16x^2 - 25y^2$. 40

Answer ..... [2]

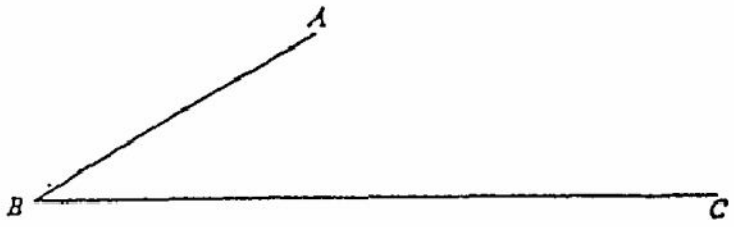
8 Two representatives are to be chosen at random from 14 boys and 9 girls. If the first choice is a boy, what is the probability that the second choice will be a girl?

Answer ..... [2]

9 The scale of a map of Europe is 1 : 2 000 000. Find the actual distance in kilometres between the towns St. Malo and Roscoff, which are 7 centimetres apart on the map.

Answer ..... km [2]

10



(*a*) On the diagram above, construct

(i) the bisector of the angle ABC,

(ii) the perpendicular bisector of the line BC.

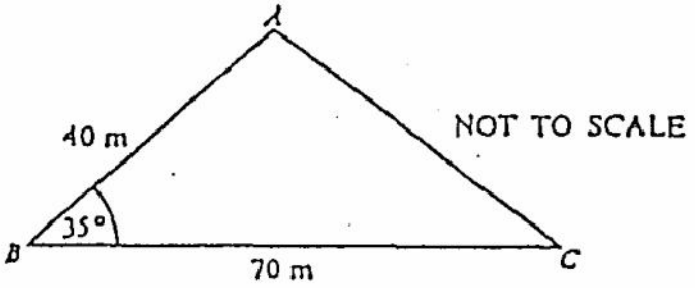
[2]

(*b*) These two lines meet at the point E.

Measure the length of EC.

Answer (*b*) EC = ... cm [1]

11



A gardener marks off a triangular piece of land for growing vegetables. Given that $AB = 40$ metres, $BC = 70$ metres and angle $ABC = 35°$, calculate the area of the piece of land.

Answer ..... m^2 [3]

---

12 It is given that $C = 2\pi r$ and $A = \pi r^2$.

(a) Express r in terms of C and π.

Answer (a) ..... [1]

(b) Express A in terms of C and π, giving your answer in its simplest form.

Answer (b) ..... [2]

---

13 . The diameter of a coin is 7.9×10^{-3} metres.

Express this number

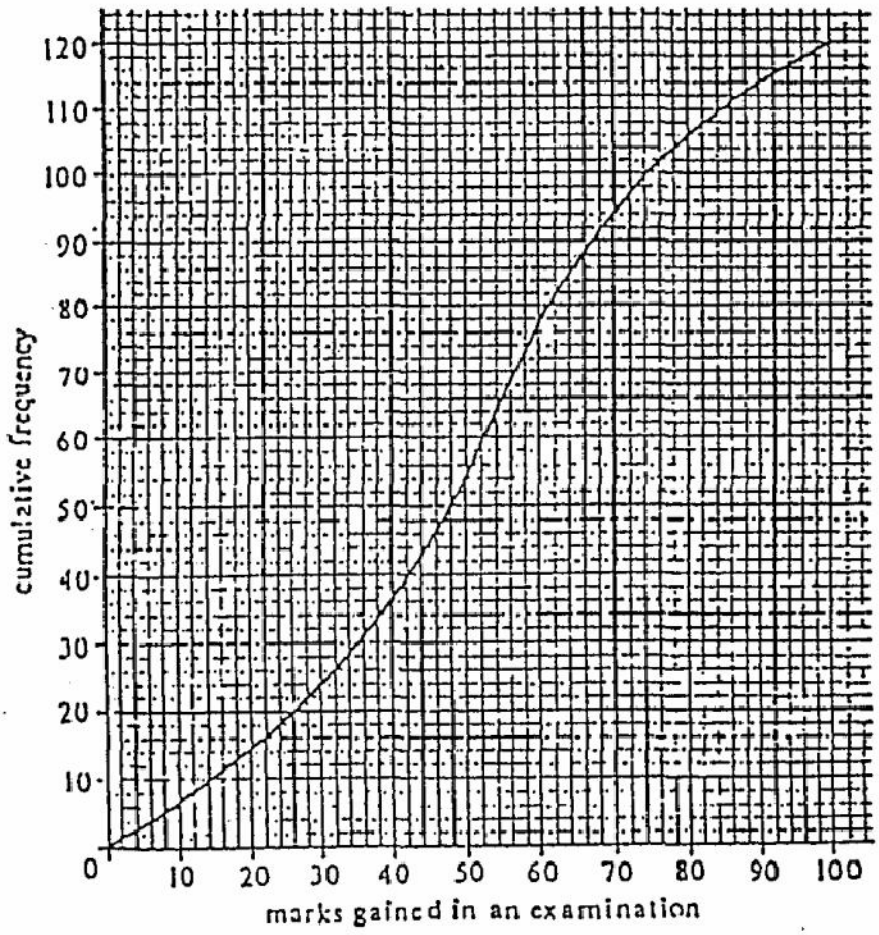
(*a*) in kilometres, giving your answer in standard form,

Answer (*a*) ..... km [2]

(*b*) in millimetres.

Answer (*b*) ..... mm [1]

14



Use the cumulative frequency diagram above to estimate the interquartile range.

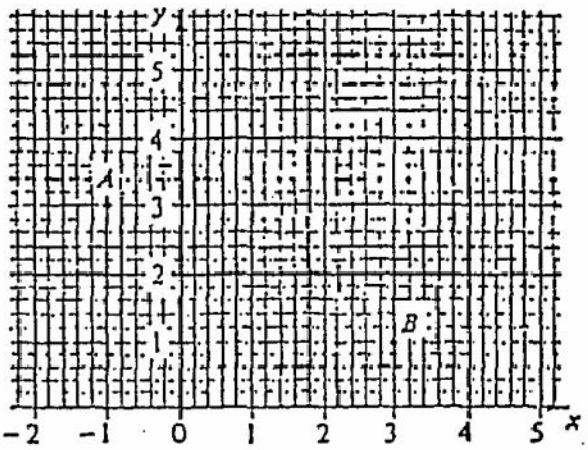
Answer..... marks [3]

15 A mountain railway track has a constant gradient. It rises a vertical distance of 8 metres for every 35 metres of track.

Calculate, to the nearest tenth of a degree, the angle the track makes with the horizontal.

Answer ..... [3]

16



The point $A(-1, 3)$ is mapped onto the point $B(3, 1)$ by the translation T.

(*a*) State the vector which represents T.

Answer (*a*) ( ) [2]

(*b*) Describe another type of transformation which would map A onto B.

Answer (*b*) .....

.....

..... [2]

17 The value of a house increases by 10% each year. It is valued at $55 000 today. 44

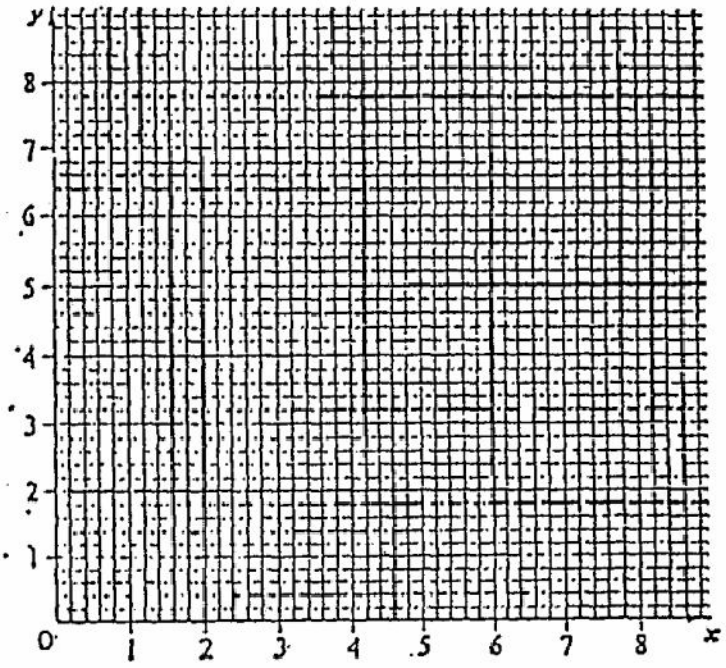
(a) What will it be worth in two years time?

Answer (a) $ ..... [2]

(b) What was it worth one year ago?

Answer (b) $ ..... [2]

18



(a) On the grid above, draw the straight line

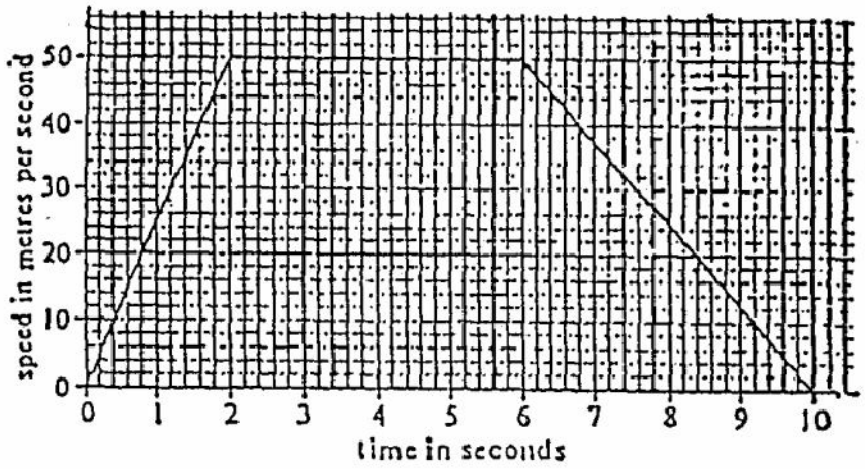
$$4y + 7x - 28 = 0.$$

[2]

(b) What is the gradient of this line?

Answer (b) Gradient = ... [2]

19



From the speed-time diagram above, calculate

(*a*) the total distance travelled in the ten seconds,

Answer (*a*) ..... m [2]

(*b*) the average speed in this interval of time.

Answer (*b*) ..... m/s [2]

---

20 The formula for the sum of the squares of the first n positive integers is $\frac{1}{6}n(n+1)(2n+1)$.

Find

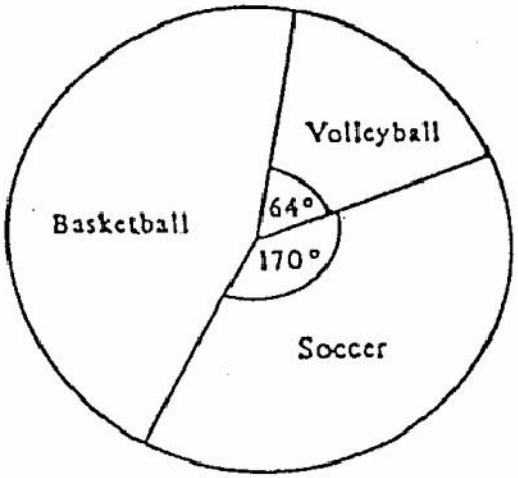
(*a*) the sum of the squares of the first 40 positive integers,

Answer (*a*) ..... [2]

(*b*) the sum of the squares of all the integers from 41 to 80 inclusive.

Answer (*b*) ..... [2]

21



NOT TO SCALE

Each of the students in a year group played Volleyball or Basketball or Soccer. The pie chart above represents the number of students who played these games.

(*a*) If 63 students played Basketball, how many students were there in the year group?

Answer (*a*) ..... [2]

(*b*) Calculate the percentage of the year group who played Volleyball.

Answer (*b*) ..... % [2]

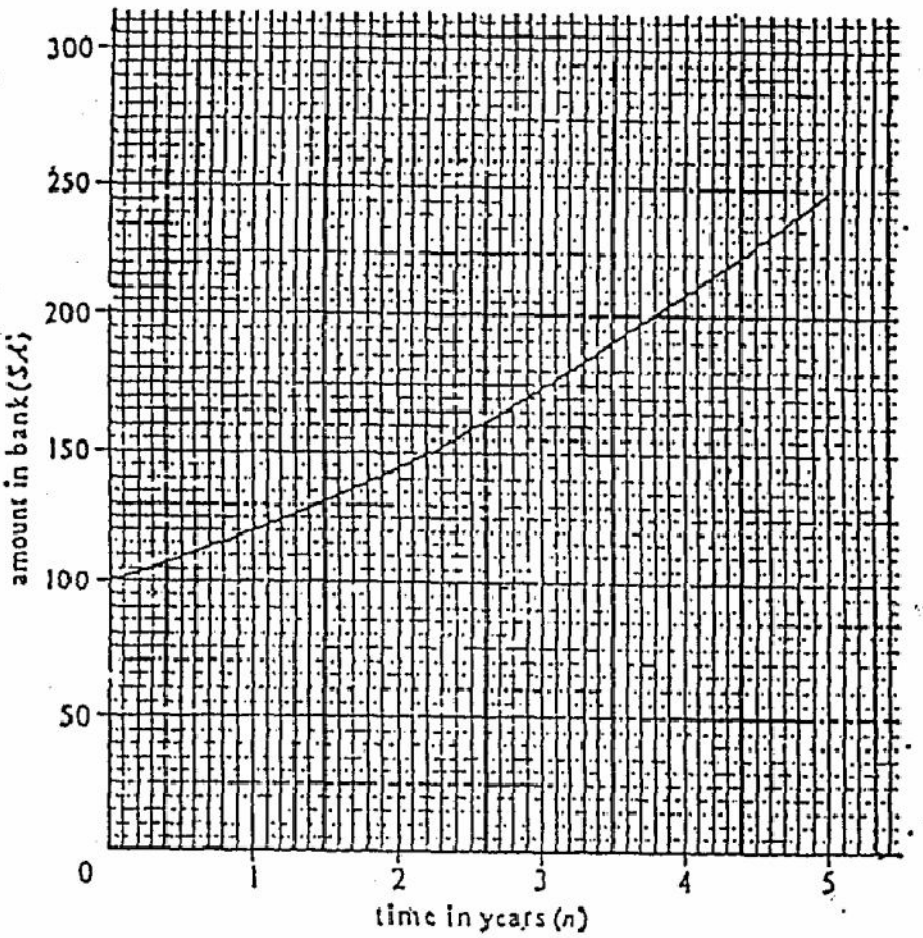
---

22 Solve the quadratic equation

$$x^2 + 2x = 1.25.$$

Answer $x =$ ..... or ..... [5]

23



47

If we leave $100 in the bank at 20% interest per annum then the amount $A, after n years, is shown by the graph above.

(a) Estimate the *interest* earned during the first four years.

Answer (a) ..... [2]

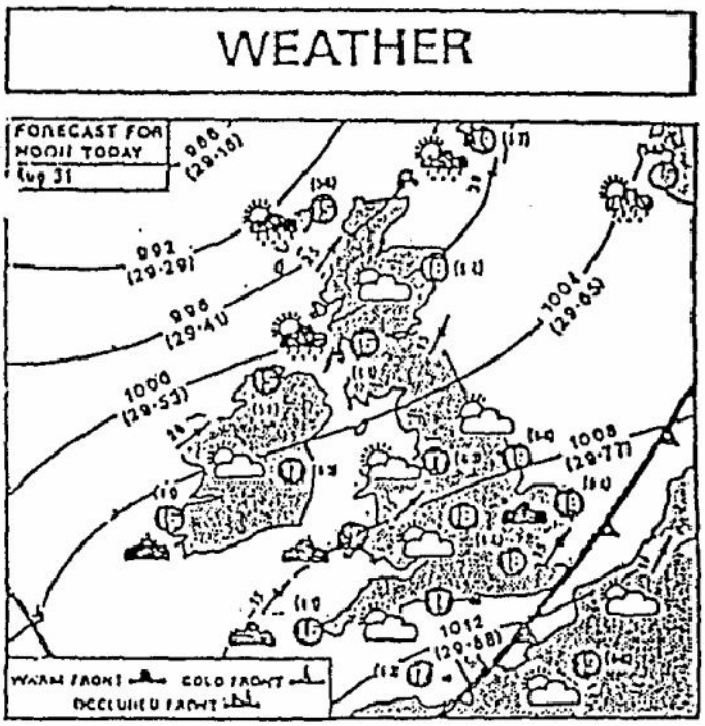
(b) Draw the tangent to the curve at the point (3, 173). [1]

(c) Estimate the gradient of the curve at the point (3, 173).

Answer (c) gradient = ... [2]

24

48



The diagram above shows the weather forecast for Britain at noon on August 31st.

(*a*) The black circles show temperatures in degrees Celsius. The Fahrenheit temperatures are shown in brackets alongside.

If the temperature is 15 °C, find the Fahrenheit equivalent.

Answer (*a*) ..... °F [1]

(*b*) The arrows indicate the wind direction. The speed of the wind in miles per hour is shown above them.

Given that 8 kilometres is approximately 5 miles, express a wind speed of 15 miles per hour in metres per second. Give your answer to the nearest whole number.

Answer (*b*) ..... m/s. [2]

(*c*) The pressure in millibars is shown on the curved lines in the diagram and the pressure in inches is given in brackets. At a point not shown on the map the pressure is 30.89 inches. Find the pressure in millibars at this point, to the nearest whole number.

Answer (*c*) ..... millibars [2]

Centre Number | Candidate Number 49

Candidate Name .....

0580/2
0581/2

IGCSE JUNE MATHEMATICS PAPER 2

Tuesday 22 MAY 1990 Afternoon 1 h 30 min

Additional materials provided by the Syndicate:
1. Mathematical tables

Additional materials proivided by the school/candidate:
2. Electronic calculator 3. Geometrical Instruments.

International General Certificate of Secondary Education

Instructions to candidates:

Write your name and examination number in the spaces provided at the top of this page.

You should answer all *the questions in the spaces provided on the question paper.*

If working is needed for any question it must be shown in the space below that question.

Electronic calculators should be used.

Three figure accuracy is required in your answers except where stated otherwise.

The total of the marks for this paper is 70.

The intended marks for questions or parts of questions are given in brackets [ ].

This Question Paper consists of 14 printed pages and 2 blank pages.

[Turn over

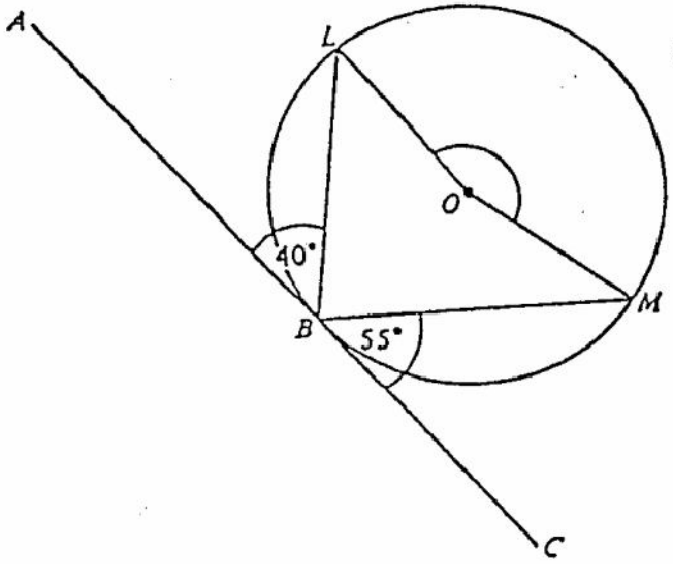
50

1 Express as a power of 3 in its simplest form

$$\frac{3^5}{81^{\frac{1}{2}}}$$

Answer ..... [2]

2



In the diagram above, ABC is the tangent touching the circle, centre O, at the point B. Points L and M lie on the circumference of the circle such that angle $ABL = 40°$ and angle $CBM = 55°$.

Find the obtuse angle LOM.

Answer angle LOM = ... [2]

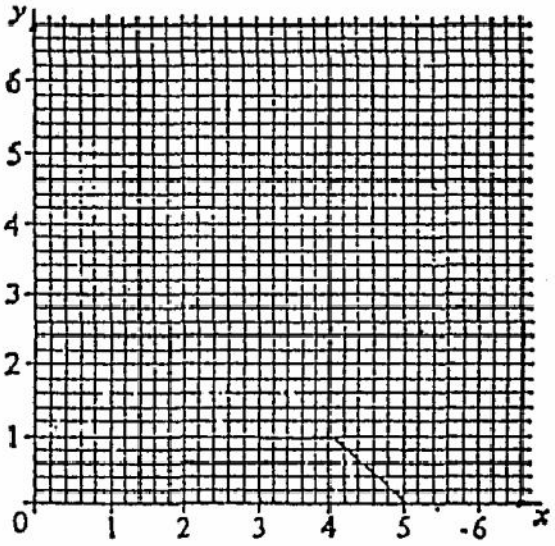
51

3 Find the matrix M such that

$$\begin{pmatrix} 2 & 4 \\ -1 & -3 \end{pmatrix} M = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}.$$

Answer M = ( ) [3]

4



On the grid above draw the lines $x = 3$, $y = 1$ and $x + y = 5$.

Indicate clearly the region on the grid described by

$$x \geqslant 3,$$
$$y \leqslant 1,$$
$$\text{and } x + y \leqslant 5$$

by shading the unwanted regions. [3]

52

For the use of the Examiner

5

A cylindrical five-litre tin of paint has a height of 20 centimetres.

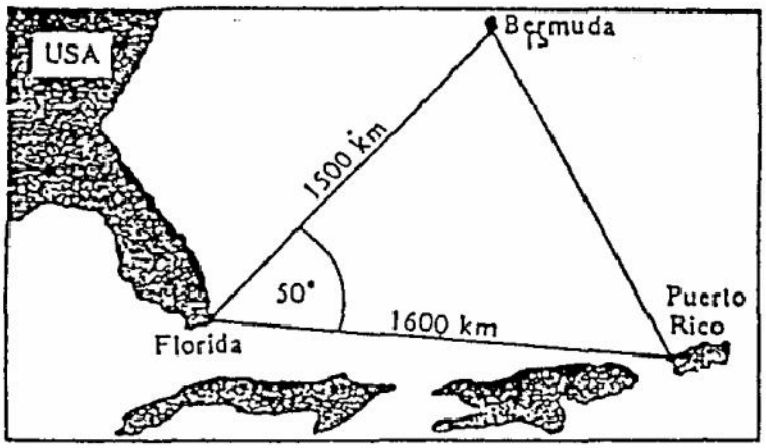
(*a*) Express 5 litres in cubic centimetres.

Answer (*a*) ..... cm^3 [1]

(*b*) Calculate the radius of the tin. (π is approximately 3.142.)

Answer (*b*) ..... cm [2]

6



The Bermuda Triangle is an area of sea in which ships are supposed to disappear mysteriously. The distance from Florida to Bermuda is 1500 kilometres, the distance from Florida to Puerto Rico is 1600 kilometres and the angle of the Triangle at Florida is 50°.

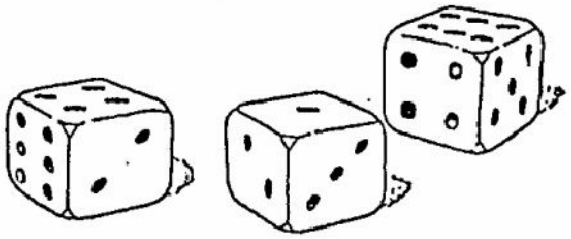
Calculate the distance from Bermuda to Puerto Rico.

Answer ..... km [4]

53

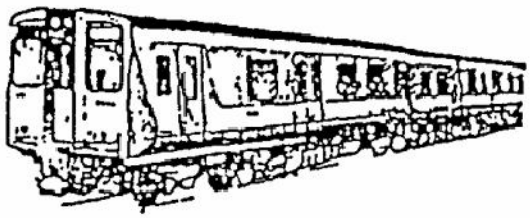
7

To win a Teddy Bear at a Summer Fair, Sangita must roll 3 dice and obtain a score of either 17 or 18.



Expressing your answer as a fraction in its simplest form, find the probability of Sangita winning a Teddy Bear.

Answer ..... [3]

8. 

54

When trains travel at high speed the air resistance (R newtons) varies as the square of the speed (V km/h).

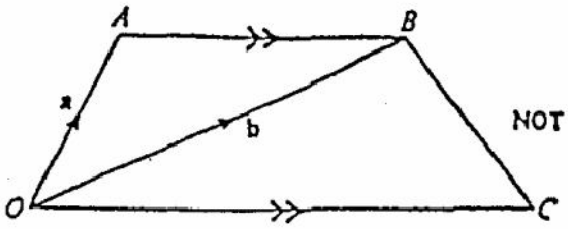
(a) If the air resistance is 8100 newtons when the speed is 60 km/h find, in the form of an equation, the relation between R and V.

Answer (a) R = ... [2]

(b) What is the air resistance when the speed of the train is 80 km/h?

Answer (b) ..... newtons [1]

9



In the diagram above, OC is parallel to AB and $OC = 2AB$. Given that $\vec{OA} = \mathbf{a}$ and $\vec{OB} = \mathbf{b}$ find, in terms of a and b,

(a) $\vec{AB}$,

Answer (a) $\vec{AB} =$ ..... [1]

(b) $\vec{OC}$,

Answer (b) $\vec{OC} =$ ..... [1]

(c) $\vec{BC}$.

Answer (c) $\vec{BC} =$ ..... [1]

---

10 A Dutch bank is asked by a customer to change one million Italian lire into Dutch guilders. The bank takes 3% of this sum as a charge for changing currency. If 650 lire = 1 guilder, how many guilders (to the nearest guilder) does the customer receive?

Answer ..... guilders [3]

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11 Cost of sending letters to Europe

56

Not over	£ p	Not over	£ p	Not over	£ p
20 g	22	250 g	1 06	500 g	2 02
50 g	37	300 g	1 25	750 g	2 77
100 g	53	350 g	1 44	1000 g	3 52
150 g	70	400 g	1 64	1250 g	4 07
200 g	88	450 g	1 83	1500 g	4 62

(£1 = 100p).

A firm in London wishes to send two letters to a client in Europe. The letters have masses of 75 g and 215 g.

Using the table above, find

(*a*) the total cost of sending the two letters,

Answer (*a*) £ ..... [1]

(*b*) how much the firm would save if the two letters were posted in a single envelope.

Answer (*b*) ..... p [2]

12 Mr Beneton, on a camping holiday in Europe, travels from St. Malo to Houlgate at an average speed of 60 km/h for 2 hours. He then travels from Houlgate to Cherbourg, a distance of 84 kilometres, at an average speed of 70 km/h. Calculate the average speed of the whole journey from St. Malo to Cherbourg.

Answer ..... km/h [3]

57

For the use of the Examiner

13 6 apples and 3 oranges cost 129 cents.
2 apples and 5 oranges cost 111 cents.
Work out the cost of

(a) 8 apples and 8 oranges,

Answer (a) ..... cents [1]

(b) 2 apples and 2 oranges,

Answer (b) ..... cents [1]

(c) 1 orange,

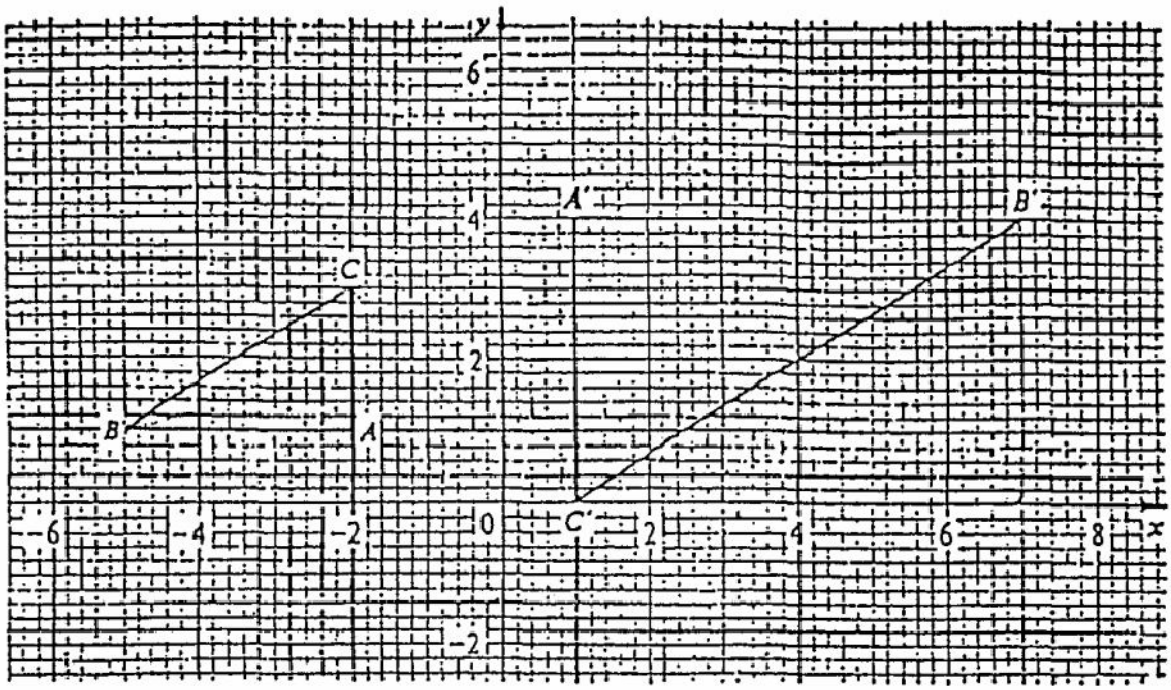
Answer (c) ..... cents [1]

(d) 1 apple.

Answer (d) ..... cents [1]

58 For the use of the Examiner

14



$\triangle ABC$ is mapped onto $\triangle A'B'C'$ by an enlargement.

(*a*) Find the centre of the enlargement.

Answer (*a*) (..... , ...) [1]

(*b*) What is the scale factor of the enlargement?

Answer (*b*) ..... [2]

15 (*a*) Expand $(x + 3)(3x - 2)$, expressing your answer in its simplest form.

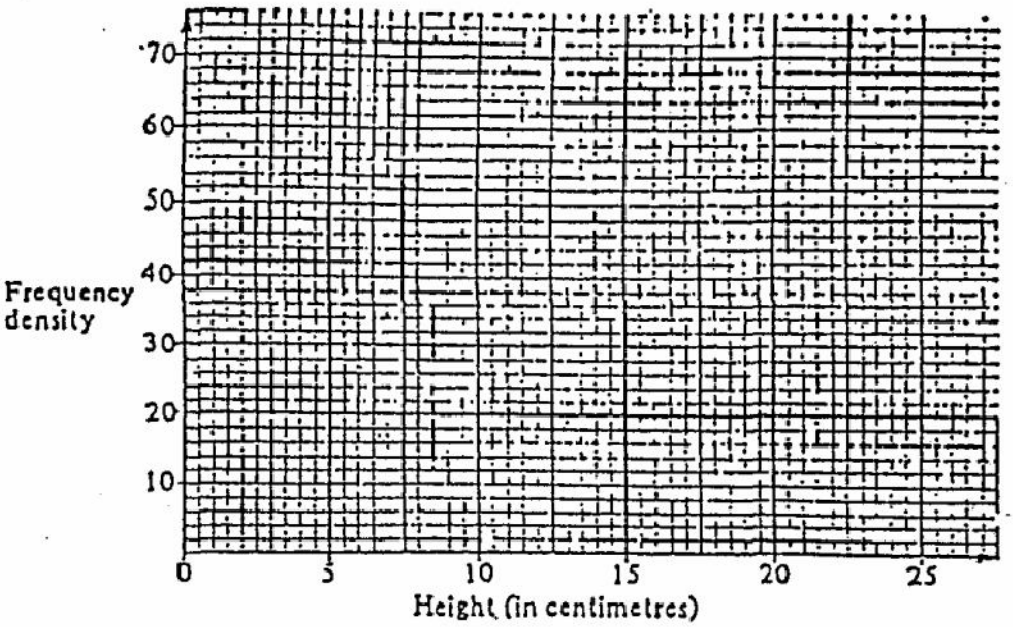
Answer (*a*) ..... [2]

(*b*) Factorise $6x^2 + 17x + 5$.

Answer (*b*) ..... [2]

59

16



A large sample of stalks of wheat were selected 8 weeks after sowing. Their heights were measured and the results displayed on the histogram above.

Given that there were 100 stalks of wheat with heights between 0 and 5 centimetres, calculate the number of stalks with heights between 10 and 15 centimetres.

Answer ..... [3]

17 Two numbers, x and $(x + 6)$, have a product of 91.

(*a*) Form an equation in x to show this information.

Answer (*a*) ..... [1]

(*b*) Solve your equation to find the two possible values of x.

Answer (*b*) $x =$ ..... or $x =$ ..... [3]