Write your name here

Surname	Other names

Pearson Edexcel
Level 1/Level 2 GCSE (9-1)

Centre Number | | | | | |

Candidate Number | | | | |

Mathematics

Paper 1 (Non-Calculator)

Aiming for 9

Higher Tier

Spring 2023 Practice Paper
Time: 1 hour 30 minutes

Paper Reference
1MA1/1H

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

Total Marks

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 not be used.**

Information

- The total mark for this paper is 80. There are 21 questions.
- Questions have been arranged in an ascending order of mean difficulty, as found by students achieving Grade 9 in the Summer and November 2022 examinations.
- Questions marked with an asterisk (*) also appear on the Higher Tier paper.
- 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

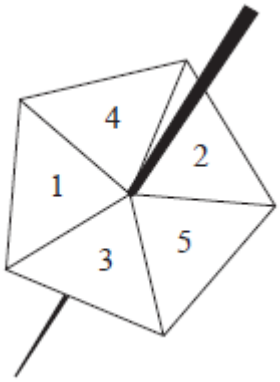
- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Answer ALL TWENTY ONE questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Lina spins a biased 5-sided spinner 40 times.



Here are her results.

Score	1	2	3	4	5
Frequency	6	8	9	7	10

Lina is now going to spin the spinner another two times.

(*a*) Work out an estimate for the probability that she gets a score of 5 both times.

.....

(2)

Derek is going to spin the spinner a large number of times.

(*b*) Work out an estimate for the percentage of times Derek can expect to get a score of 1

.....%

(2)

(Total for Question 1 is 4 marks)

2 The table shows the amount of snow, in cm, that fell each day for 30 days.

Amount of snow (s cm)	**Frequency**
$0 \leq s < 10$	8
$10 \leq s < 20$	10
$20 \leq s < 30$	7
$30 \leq s < 40$	2
$40 \leq s < 50$	3

Work out an estimate for the mean amount of snow per day.

..... cm

(Total for Question 2 is 3 marks)

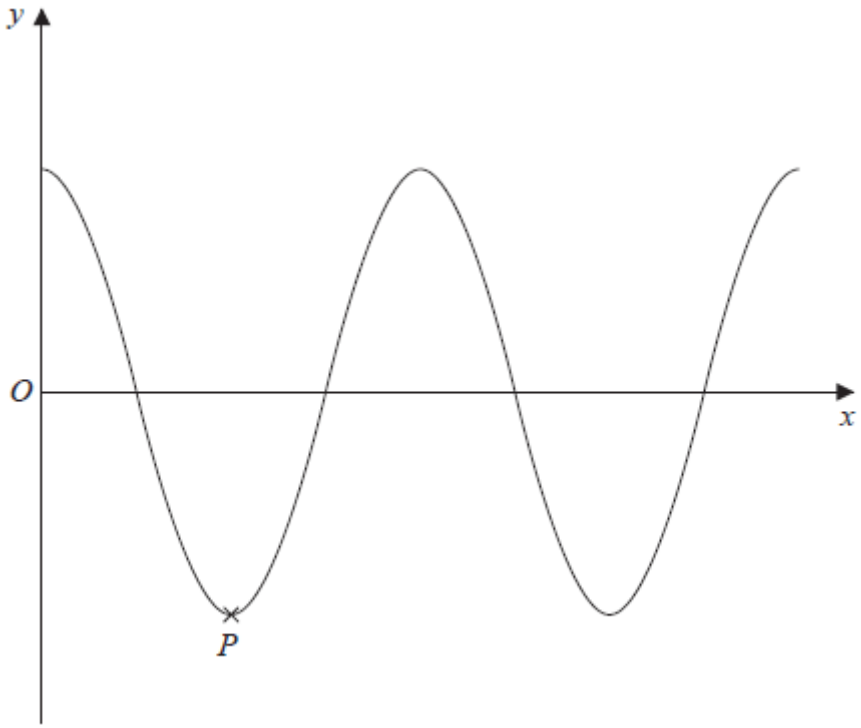
3 Work out the value of $\dfrac{\left(5\frac{4}{9}\right)^{-\frac{1}{2}} \times \left(4\frac{2}{3}\right)}{2^{-3}}$

You must show all your working.

.....

(Total for Question 3 is 4 marks)

4



The diagram shows a sketch of part of the curve with equation $y = \cos x°$
P is a minimum point on the curve.

Write down the coordinates of P.

(..... , ...)

(Total for Question 4 is 2 marks)

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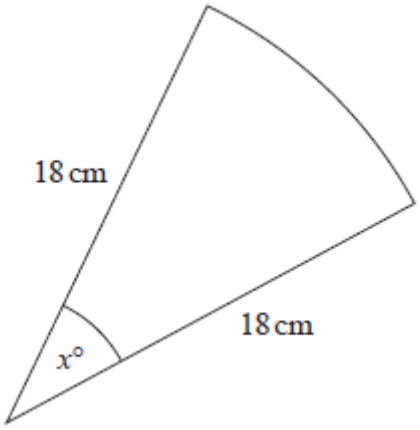
5 The diagram shows a sector of a circle of radius 18 cm.



The length of the arc is 4π cm.

Work out the value of x.

x = ...

(Total for Question 5 is 3 marks)

6 Alfie has 11 cards.

He has

3 blue cards
7 green cards
and 1 white card.

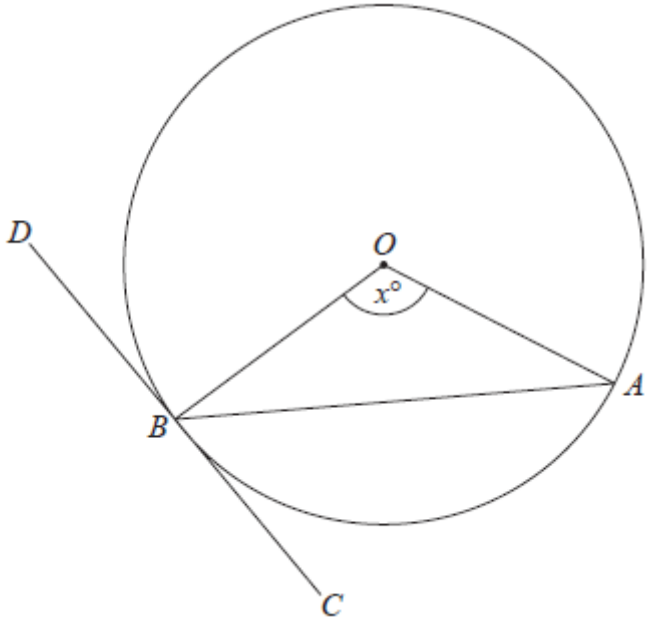
Alfie takes at random 2 of these cards.

Work out the probability that he takes cards of different colours.

.....

(Total for Question 6 is 3 marks)

7



A and B are points on a circle, centre O.

DBC is the tangent to the circle at B.
Angle $AOB = x°$

Show that angle $ABC = \frac{1}{2}x°$
You must give a reason for each stage of your working.

(Total for Question 7 is 3 marks)

8 Solve $\frac{1}{x} - \frac{1}{x+1} = 4$

Give your answer in the form $a \pm b\sqrt{2}$ where a and b are fractions.

.....

(Total for Question 8 is 5 marks)

9 The centre of a circle is the point with coordinates $(-1, 3)$

The point A with coordinates $(6, 8)$ lies on the circle.

Find an equation of the tangent to the circle at A.
Give your answer in the form $ax + by + c = 0$ where a, b and c are integers.

.....

(Total for Question 9 is 4 marks)

10 y is directly proportional to the square root of t.
$y = 15$ when $t = 9$

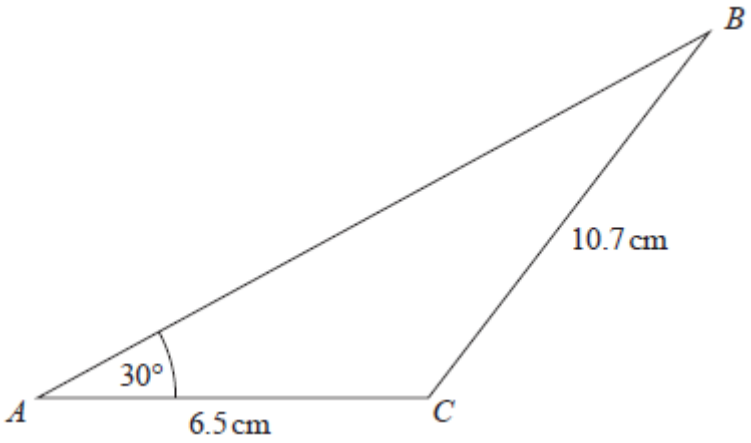
t is inversely proportional to the cube of x.
$t = 8$ when $x = 2$

Find a formula for y in terms of x.
Give your answer in its simplest form.

.....

(Total for Question 10 is 4 marks)

11 Here is a triangle ABC.



Work out the value of sin ABC

Give your answer in the form $\frac{m}{n}$ where m and n are integers.

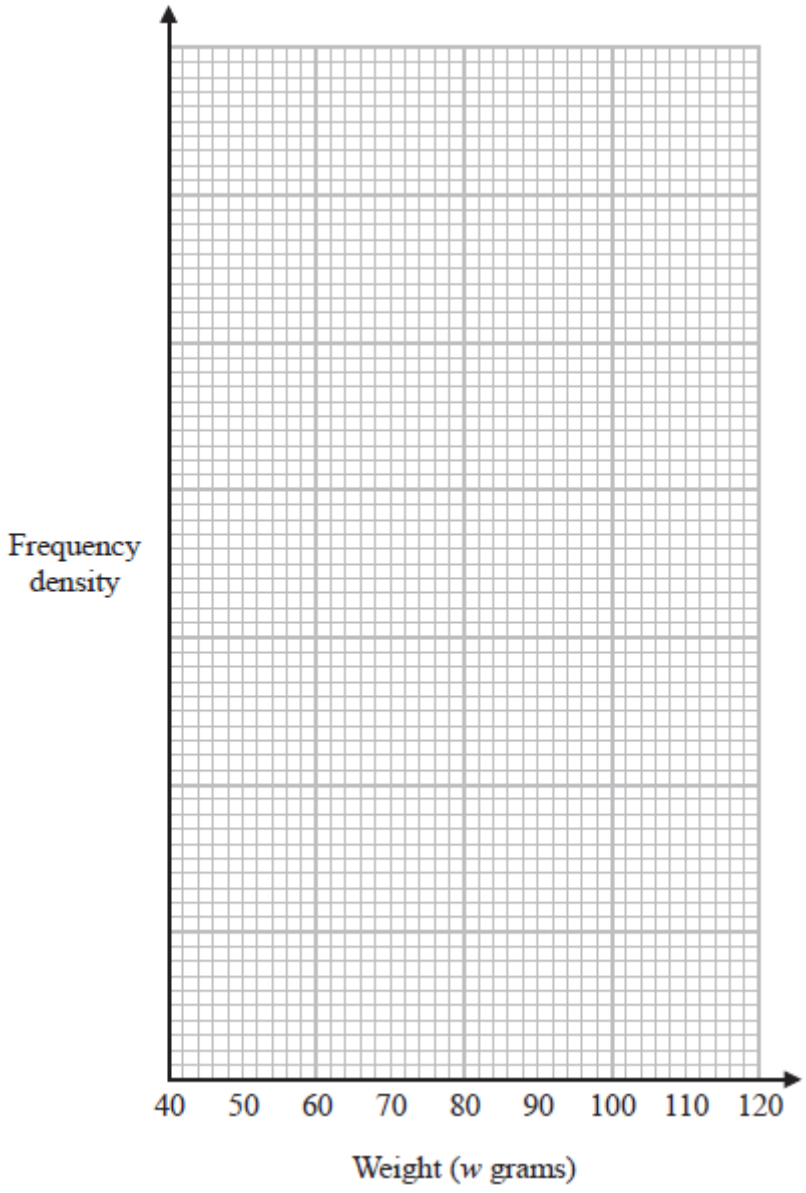
.....

(Total for Question 11 is 4 marks)

12 The table shows information about the weights, in grams, of some potatoes.

Weight (w grams)	Number of potatoes
$50 < w \leq 70$	20
$70 < w \leq 80$	50
$80 < w \leq 90$	60
$90 < w \leq 110$	30

On the grid, draw a histogram for this information.



(Total for Question 12 is 3 marks)

13 Here are the first five terms of a geometric sequence.

$$\sqrt{5} \qquad 10 \qquad 20\sqrt{5} \qquad 200 \qquad 400\sqrt{5}$$

(*a*) Work out the next term of the sequence.

.....

(2)

The 4th term of a different geometric sequence is $\frac{5\sqrt{2}}{4}$

The 6th term of this sequence is $\frac{5\sqrt{2}}{8}$

Given that the terms of this sequence are all positive,

(*b*) work out the first term of this sequence.
You must show all your working.

.....

(3)

(Total for Question 13 is 5 marks)

14 A, B and C are three points such that

$$\overrightarrow{AB} = 3\mathbf{a} + 4\mathbf{b}$$
$$\overrightarrow{AC} = 15\mathbf{a} + 20\mathbf{b}$$

(a) Prove that A, B and C lie on a straight line.

(2)

D, E and F are three points on a straight line such that

$$\overrightarrow{DE} = 3\mathbf{e} + 6\mathbf{f}$$
$$\overrightarrow{EF} = -10.5\mathbf{e} - 21\mathbf{f}$$

(b) Find the ratio

length of DF : length of DE

.....

(3)

(Total for Question 14 is 5 marks)

15 (*a*) Prove that

$$(2m + 1)^2 - (2n - 1)^2 = 4(m + n)(m - n + 1)$$

(3)

Sophia says that the result in part (*a*) shows that the difference of the squares of any two odd numbers must be a multiple of 4

(*b*) Is Sophia correct?
You must give reasons for your answer.

.....

.....

.....

(1)

(Total for Question 15 is 4 marks)

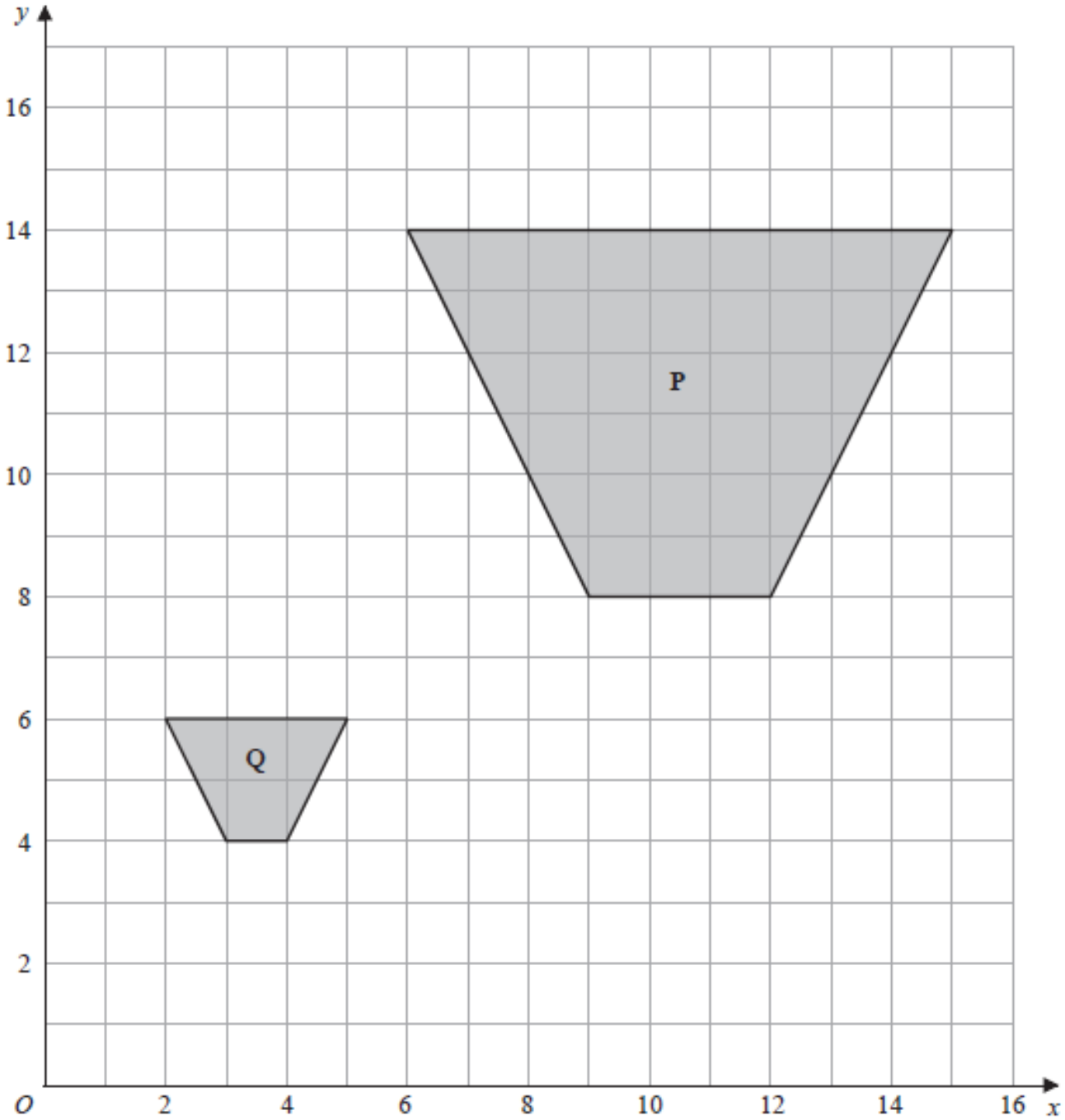
16 Solve $\frac{1}{2x-1}+\frac{3}{x-1}=1$

Give your answer in the form $\frac{p\pm\sqrt{q}}{2}$ where p and q are integers.

.....

(Total for Question 16 is 4 marks)

17



Describe fully the single transformation that maps shape **P** onto shape **Q**.

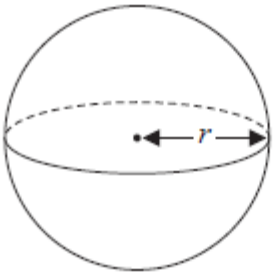
.....

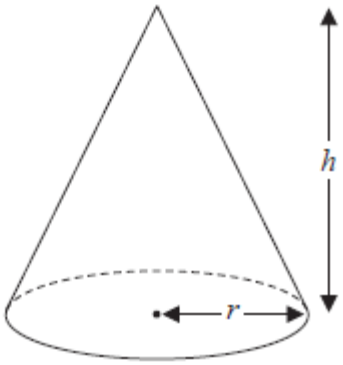
.....

.....

(Total for Question 17 is 2 marks)

18 Here is a solid sphere and a solid cone.





Volume of sphere $= \frac{4}{3}\pi r^3$

Volume of cone $= \frac{1}{3}\pi r^2 h$

All measurements are in cm.

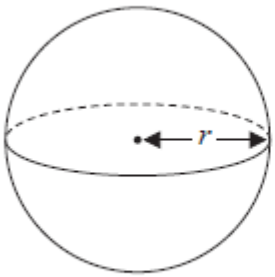
The volume of the sphere is equal to the volume of the cone.

(*a*) Find $r : h$
Give your answer in its simplest form.

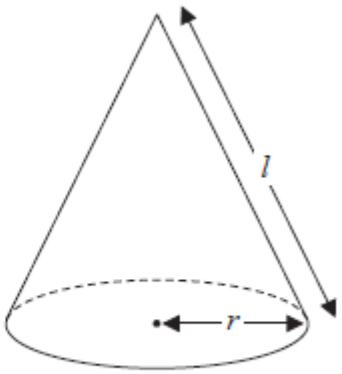
.....

(2)

Here is a different solid sphere and a different solid cone.



Surface area of sphere = $4\pi r^2$



Curved area of cone = πrl

All measurements are in cm.
The surface area of the sphere is equal to the **total** surface area of the cone.

(*b*) Find $r : h$

Give your answer in the form $1 : \sqrt{n}$ where n is an integer.

.....

(4)

(Total for Question 18 is 6 marks)

19 A first aid test has two parts, a theory test and a practical test.

The probability of passing the theory test is 0.75
The probability of passing only one of the two parts is 0.36

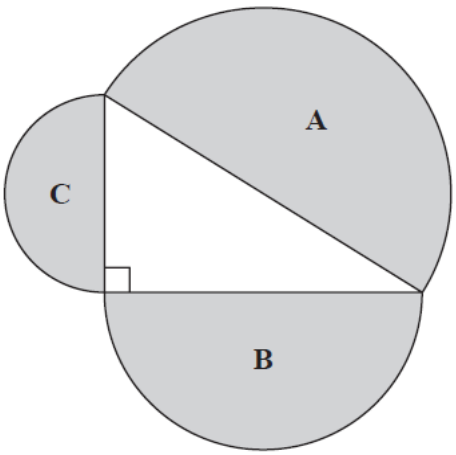
The two events are independent.

Work out the probability of passing the practical test.

.....

(Total for Question 19 is 4 marks)

20 A right-angled triangle is formed by the diameters of three semicircular regions, **A**, **B** and **C** as shown in the diagram.



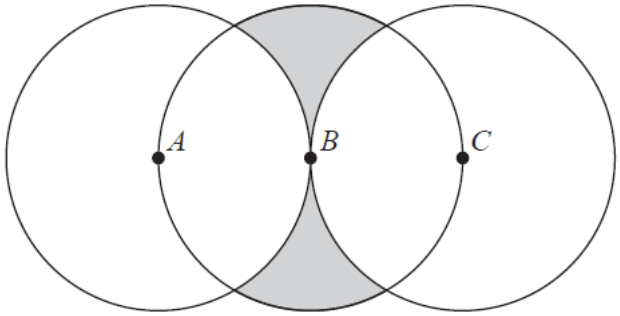
Show that

area of region **A** = area of region **B** + area of region **C**

(Total for Question 20 is 3 marks)

21 The diagram shows three circles, each of radius 4 cm.

The centres of the circles are A, B and C such that ABC is a straight line and $AB = BC = 4$ cm.



Work out the total area of the two shaded regions.
Give your answer in terms of π

..... cm^2

(Total for Question 21 is 5 marks)

TOTAL FOR PAPER IS 80 MARKS

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