Please check the examination details below before entering your candidate information

Candidate surname	Other names

Centre Number

Candidate Number

Pearson Edexcel International GCSE

Time: 2 hours

Paper reference **4MA1/1H**

Mathematics A
PAPER: 1H
Higher Tier

Grade 2
UEB Braille

You must have: Calculator, tactile ruler and protractor, compasses and drawing equipment e.g. geometry board, rubber mat, mapping pins, rubber bands, drawing stylus and spur wheel.

Total Marks

YOU WILL BE GIVEN
- **Separate Diagram Booklet.**
- **Separate Formulae Sheet.**
- **Models for Question 7 and Question 22.**

Instructions
- **On your paper, write** your name, centre number and candidate number.
- Answer **all** questions.
- Without sufficient working, correct answers may be awarded no marks.
- Answer the questions **on your paper.**
- **Calculators may be used**.
- You must **NOT** write anything on the formulae **booklet**.
  Anything you write on the formulae **booklet** will gain NO credit.

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.
- Check your answers if you have time at the end.

Turn over ▶

U 6 8 7 9 6 A 0 1 2 8

Pearson

Arithmetic series

Sum to n terms, $S_n = \dfrac{n}{2}\,[2a + (n-1)d]$

The quadratic equation

The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$ are given by:

$$x = \frac{-b \pm \sqrt{^2 - 4ac}}{2a}$$

Area of trapezium $= \dfrac{1}{2}(a+b)h$
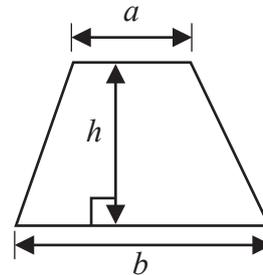
Trigonometry
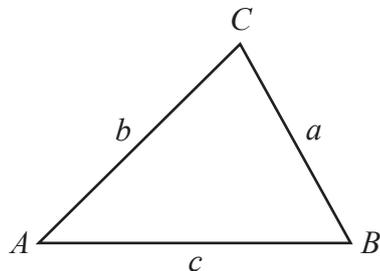
In any triangle ABC

Sine Rule $\quad \dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

Cosine Rule $\quad a^2 = b^2 + c^2 - 2bc\cos A$

Area of triangle $= \dfrac{1}{2}ab\sin C$

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

Curved surface area of cone $= \pi r l$
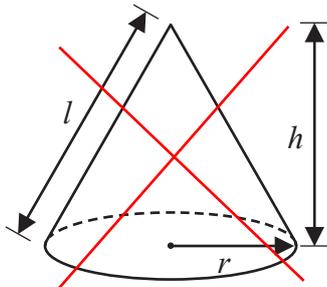
Volume of prism
= area of cross section × length
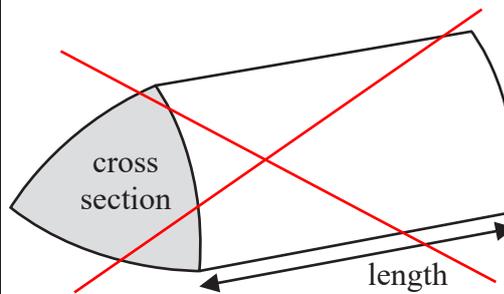
Volume of cylinder $= \pi r^2 h$
**Curved surface area
of cylinder** $= 2\pi r h$
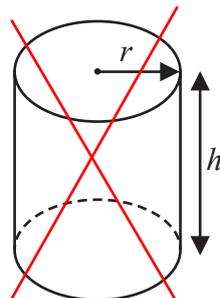
Volume of sphere $= \dfrac{4}{3}\pi r^3$

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

U 6 8 7 9 6 A 0 2 2 8
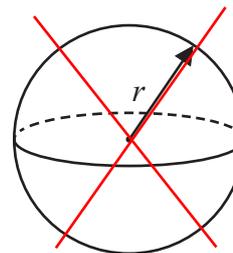
Answer ALL TWENTY FOUR questions.

Write your answers on your paper.

You must write down all the stages in your working.

1. **The numbers below** are the first five terms of an arithmetic sequence.

$$1 \quad 5 \quad 9 \quad 13 \quad 17$$

(a) Find an expression, in terms of n, for the nth term of this sequence.

Ans: ....

(2)

(b) The nth term of another arithmetic sequence is $3n + 5$

Find an expression, in terms of m, for the $(2m)$th term of this sequence.

Ans: ....

(1)

(Total for Question 1 is 3 marks)

U 6 8 7 9 6 A 0 3 2 8

2. **Look at the diagram for Question 2 in the separate Diagram Booklet.**
   The diagram shows a plan view of a biased 4-sided spinner.

Plan view of biased 4-sided spinner
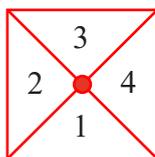
The table **below** gives the probabilities that, when the spinner is spun once, it will land on 1 or it will land on 3

Table turned vertical in Braille

Number	1	2	3	4
Probability	0.26		0.18	

The probability that the spinner will land on 2 is equal to the probability that the spinner will land on 4

Ravina is going to spin the spinner a number of times.

Ravina works out that an estimate for the number of times the spinner will land on 3 is 45

Work out an estimate for the number of times the spinner will land on 4

Ans: ....

(Total for Question 2 is 4 marks)

U 6 8 7 9 6 A 0 4 2 8

3. (a) Find the highest common factor (HCF) of 56 and 84
Show your working clearly.

Ans: ....
(2)

(b) Find the lowest common multiple (LCM) of 60 and 72
Show your working clearly.

Ans: ....
(2)

(Total for Question 3 is 4 marks)

U 6 8 7 9 6 A 0 5 2 8

4. **Look at the diagram for Question 4 in the separate Diagram Booklet.**
The diagram is NOT accurately drawn.

The diagram shows parts of three regular polygons, **A**, **B** and **C**, meeting at a point.

polygon B
$7x°$
polygon C
$3x°$
$8x°$
polygon A
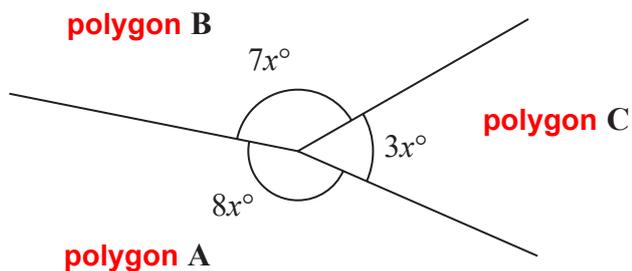
In the diagram:
the internal angle of polygon A = 8x°
the internal angle of polygon B = 7x°
the internal angle of polygon C = 3x°

Polygon **B** has *n* sides.

Work out the value of *n*.

Ans: *n* = ...

(Total for Question 4 is 4 marks)

5. (a) Expand and simplify $(n - 6)(n + 4)$

Ans: ....
(2)

(b) Solve $2x - 3 = \dfrac{3x - 5}{4}$

Show clear algebraic working.

Ans: $x =$ ....
(3)

(Total for Question 5 is 5 marks)

6. Asha bought an apartment.

The table **below** gives information about the value of apartments, in euros, and the annual service charge band.

Value (*x* euros)	Service charge band
$x \geqslant 700{,}000$	A
$600{,}000 \leqslant x < 700{,}000$	B
$500{,}000 \leqslant x < 600{,}000$	C
$400{,}000 \leqslant x < 500{,}000$	D
$0 < x < 400{,}000$	E

In 2021, the value of Asha's apartment was 634,400 euros.

The value of Asha's apartment had increased by 4% from its value in 2020

(a) Has the annual service charge band changed for Asha's apartment?
Show your working clearly.
Ans:

(3)

(b) Pam bought a boat.

In each year after Pam bought the boat, the value of the boat depreciated by 15%

Work out the total percentage by which the value of the boat had depreciated by the end of the second year after Pam bought the boat.

Ans: .... %

(3)

(Total for Question 6 is 6 marks)

7. **Ask for the model for Question 7. The model is NOT accurate.**
   The model represents a cylinder.
   The cylinder is placed on the ground.
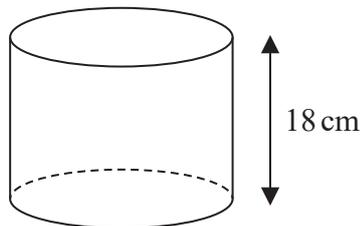
18 cm

No diagram in braille. Model provided.

The height of the cylinder is 18 cm.

The force exerted by the cylinder on the ground is 72 newtons.
The pressure on the ground due to the cylinder is 1.4 newtons/cm²
Using the formula below,

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

work out the volume of the cylinder.
Give your answer correct to 3 significant figures.

Ans: .... cm³

(Total for Question 7 is 4 marks)

8. (a) Write 0.000089 in standard form.

Ans: ....
(1)

(b) Write 8.34×10^4 as an ordinary number.

Ans: ....
(1)

(Total for Question 8 is 2 marks)

9. (a) Simplify $8 \times (4t)^0$

Ans: ....
(1)

(b) Given that

$$\mathbf{y}^6 \div \mathbf{y}^{-5} = \mathbf{y}^p$$

Find the value of p

Ans: $p =$ ....
(1)

(c) Simplify fully $\left(2k^2m^4\right)^3$

Ans: ....
(2)

(Total for Question 9 is 4 marks)

10. Two circles, C_1 and C_2, are drawn on a centimetre grid, with a scale of 1 cm for 1 unit on each axis.

The centre of circle C_1 is at the point with coordinates (–1, 3) and the radius of C_1 is 13 cm.

The centre of circle C_2 is at the point with coordinates (7, 18) and the radius of C_2 is 6 cm.

(a) Work out the distance between the centre of C_1 and the centre of C_2

Ans: .... cm

(3)

(b) Explain why circle C_1 intersects circle C_2

Ans: ....

....

(1)

(Total for Question 10 is 4 marks)

11. (a) Factorise $9x^2 - 4y^2$

Ans: ....

(2)

(b) Express $\dfrac{7}{8} - \dfrac{y+3}{4y}$ as a single fraction in its simplest form.

Ans: ....

(3)

(Total for Question 11 is 5 marks)

12. Look at the diagram for Question 12 in the separate Diagram Booklet.
The diagram shows an incomplete probability tree diagram.
Rudolf goes to the gym.

The probability that he will use the treadmill is 0.8

When he uses the treadmill, the probability that he will use the cross trainer is 0.3
When he does **not** use the treadmill, the probability that he will use the cross trainer is 0.6

(a) Complete the probability tree diagram for this information.

```
                                                           (iii).......... ─── use cross trainer
                              use treadmill <
              (i).........../                (iv).......... ─── does not use
                          /                                      cross trainer
                        /
                        \
              (ii)........\
                          does not use        (v).......... ─── use cross trainer
                          treadmill  <
                                              (vi).......... ─── does not use
                                                                 cross trainer
```
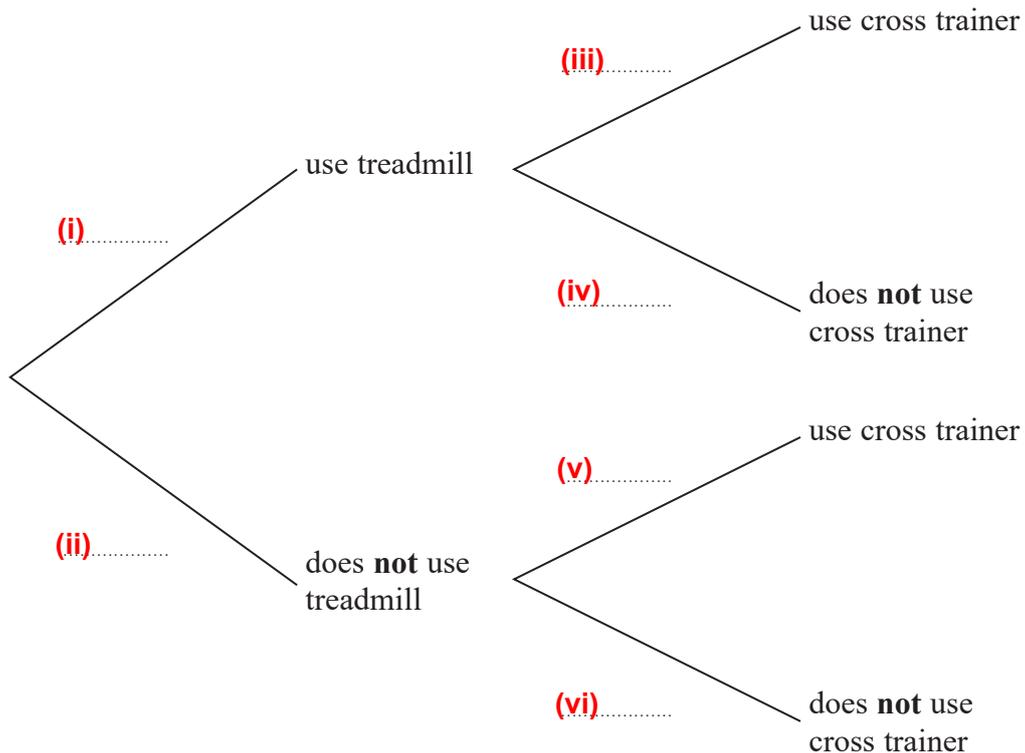
Ans: (i) ___ (ii) ___ (iii) ___ (iv) ___ (v) ___ (vi) ___   (2)

(b) Work out the probability that Rudolf uses both the treadmill and the cross trainer.

Ans: ....

(2)

(Total for Question 12 is 4 marks)

U 6 8 7 9 6 A 0 1 3 2 8

13. Antoine is going on holiday.
He makes 3 separate payments to cover the total cost of his holiday.

The table **below** shows how much money Antoine pays to the holiday company.

Payment	Amount paid
Payment 1	$\frac{3}{8}$ of the total cost
Payment 2	45% of the total cost
Payment 3	$406

Work out how much Antoine has to pay for Payment 2

Ans: $ ....

(Total for Question 13 is 5 marks)

U 6 8 7 9 6 A 0 1 4 2 8

14. The function f is defined as

$$f : x \mapsto \frac{2x}{x - 6} \qquad x \neq 6$$

(a) Find   f(10)

Ans: ....
(1)

(b) Express the inverse function f^{-1} in the form $f^{-1} : x \mapsto \dots$

Ans: $f^{-1} : x \mapsto$ ....
(3)

(Total for Question 14 is 4 marks)

15. Abraham is going to play a computer game.
Abraham can win the game, draw the game or lose the game.

For any game that Abraham plays

the probability that he wins the game is 0.3
the probability that he draws the game is 0.5
the probability that he loses the game is 0.2

When Abraham wins a game, he scores +10 points.
When Abraham draws a game, he scores 0 points.
When Abraham loses a game, he scores −5 points.

Abraham plays 3 games and the points he scores in each of the 3 games are added together to get his total score.

Work out the probability that when he has played 3 games his total score is 0 points.

Ans: ....

(Total for Question 15 is 4 marks)

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16. Without using a calculator, show that $\dfrac{12}{\sqrt{2}-1} - \left(\sqrt{2}\right)^{5} = 2\sqrt{32} + 12$

Show your working clearly.

Ans:

(Total for Question 16 is 3 marks)

17. A particle P moves along a straight line.
The fixed point O lies on this line.

The displacement of P from O at time t seconds, $t \geqslant 1$, is s metres where

$$s = 4t^2 + \frac{125}{t}$$

The velocity of P at time t seconds, $t \geqslant 1$, is v m/s

Work out the distance of P from O at the instant when $v = 0$

Ans: .... m

(Total for Question 17 is 5 marks)

18. Look at the diagram for Question 18 in the separate Diagram Booklet.
The diagram is NOT accurately drawn.
The diagram shows triangle ABC.
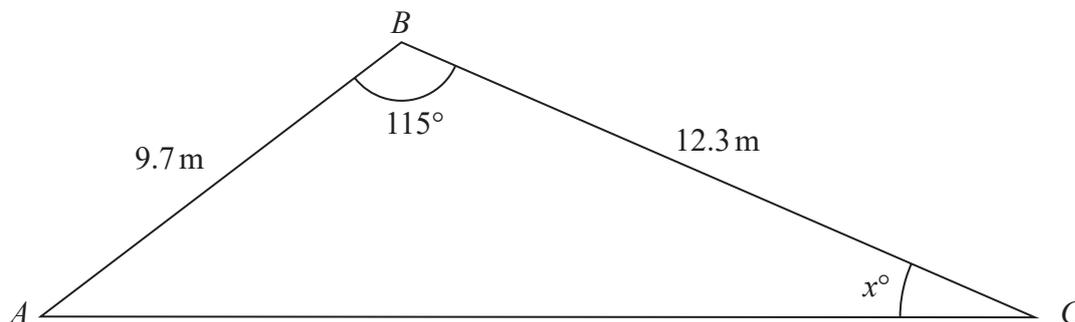
In the diagram:
AB = 9.7 m
BC = 12.3 m
angle ABC = 115º
angle BCA = xº

Work out the value of x
Give your answer correct to 3 significant figures.

Ans: $x =$ ....

(Total for Question 18 is 5 marks)

A

$(r + 7)\,$m

O

$45°$

(r + 7) m

B
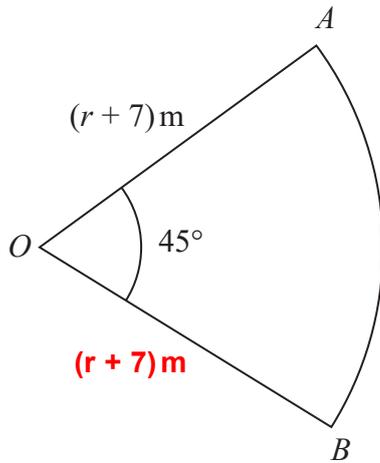
OAB is a sector **S** of a circle with centre O and radius $(r + 7)$ metres.
Angle $AOB = 45°$

A circle **C** has radius $(r - 2)$ metres.

The area of sector **S** is twice the area of circle **C**

Find the value of r
Show your working clearly.

U 6 8 7 9 6 A 0 2 0 2 8

Question 19 continued.

Ans: $r =$ ....

(Total for Question 19 is 5 marks)

20. Look at the diagram for Question 20 in the separate Diagram Booklet.
The diagram shows a sketch of part of the curve with equation $y = f(x)$
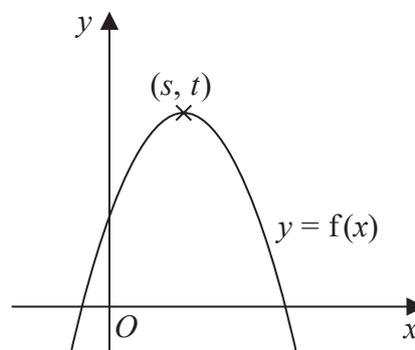
There is one maximum point on this curve.
The coordinates of this maximum point are (s, t)

Find, in terms of s and t, the coordinates of the maximum point on the curve with equation

 (i) $y = f(x - 2)$

Ans: (........................ , ...)
(1)

(ii) $y = 3f(x)$

Ans: (........................ , ...)
(1)

(Total for Question 20 is 2 marks)

U 6 8 7 9 6 A 0 2 1 2 8

21. Look at the diagram for Question 21 in the separate Diagram Booklet.
The diagram is a histogram.

The histogram shows information about the total time, m minutes, taken by each child in a school to walk to school every day for one week.

Time (m minutes)
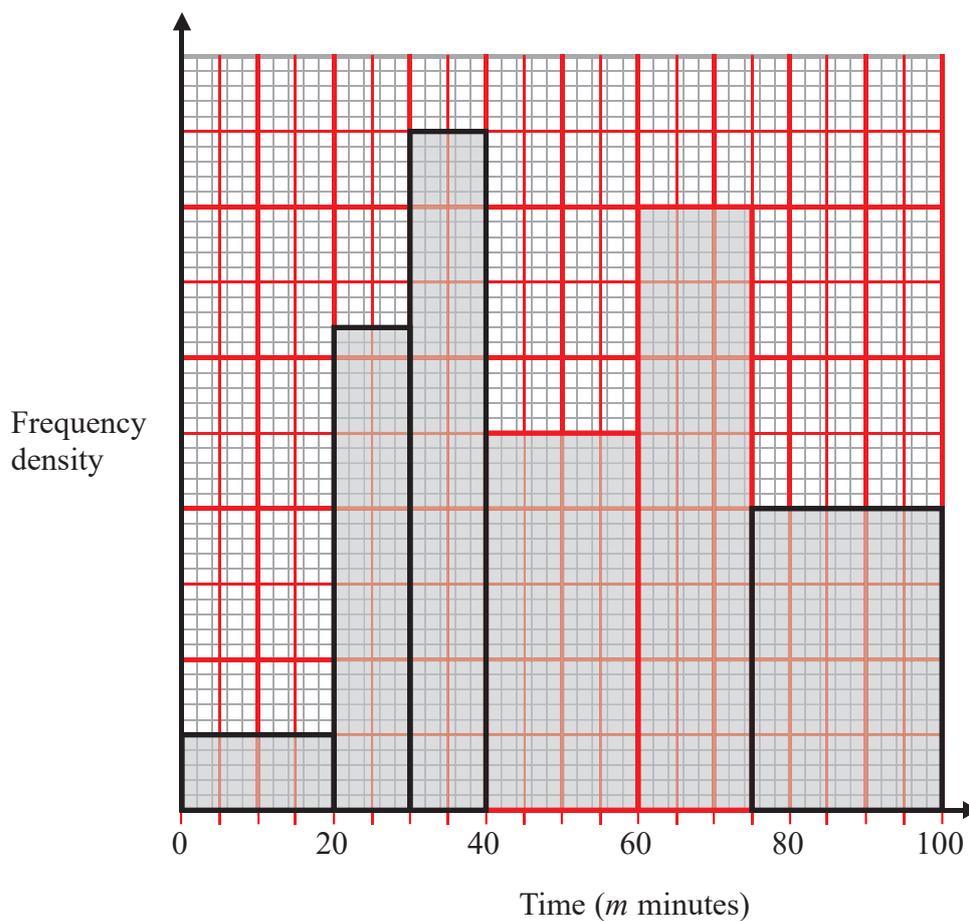
There are no children for whom $m > 100$
There are 10 children for whom $m \leqslant 20$

Work out an estimate for the number of children for whom $50 < m \leqslant 80$

Ans: ....

(Total for Question 21 is 3 marks)

22. Ask for the model for Question 22. The model is NOT accurate.
The model is a solid made from a cone and a hemisphere.

20 cm
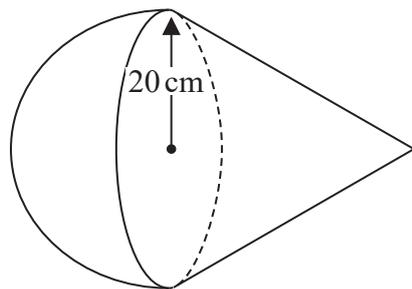
No diagram in braille. Model provided.

Look at the diagram for Question 22 in the separate Diagram Booklet.
The diagram is NOT accurately drawn.
The diagram shows a 2-D side view of the solid.
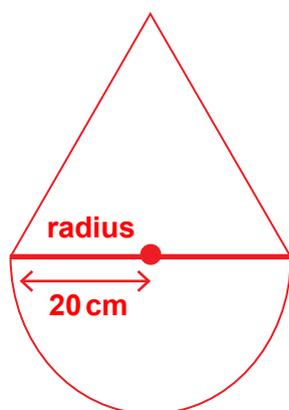
radius

20 cm

The circular plane face of the hemisphere coincides with the circular base of the cone.
The radius of the hemisphere and the radius of the circular base of the cone are both 20 cm.

The curved surface area of the cone is $580\pi \, \text{cm}^2$

The volume of the solid is $k\pi \, \text{cm}^3$

Work out the exact value of k

Ans: $k = $ ....

(Total for Question 22 is 5 marks)

U 6 8 7 9 6 A 0 2 3 2 8

23. A polygon has n sides, where $n > 5$

When arranged in order of size, starting with the largest number, the sizes of the interior angles of the polygon, in degrees, are the terms of an arithmetic sequence.

Here are the first five terms of this sequence.

<div align="center">177   175   173   171   169</div>

Find the value of n
Show clear algebraic working.

Question 23 continued

Ans: $n =$ ....

(Total for Question 23 is 6 marks)

Turn over for Question 24

Turn over ▶

U 6 8 7 9 6 A 0 2 5 2 8

24. Express each of a, b and c in terms of q so that

$$q + 12x - qx^2$$

can be written as $a - b(x - c)^2$

Ans: $a = $ ....

Ans: $b = $ ....

Ans: $c = $ ....

(Total for Question 24 is 4 marks)

TOTAL FOR PAPER IS 100 MARKS

END OF PAPER

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