Write your name here

Surname	Other names

Pearson Edexcel
International GCSE

Centre Number | Candidate Number

Mathematics A

Level 1/2
Paper 1H

Higher Tier

Thursday 24 May 2018 – Morning
Time: 2 hours

Paper Reference
4MA1/1H

You must have:
Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser, calculator. 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.
- Without sufficient working, correct answers may be awarded no marks.
- Answer the questions in the spaces provided
  – there may be more space than you need.
- **Calculators may be used.**
- You must **NOT** write anything on the formulae page.
  Anything you write on the formulae page 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 ▶

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1/1/1/1/

P 5 4 6 9 4 A 0 1 2 4

Pearson

International GCSE Mathematics

Formulae sheet – Higher Tier

Arithmetic series

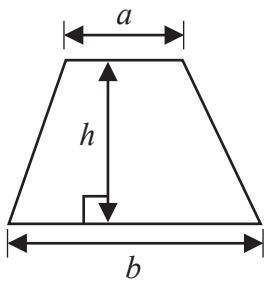
Sum to n terms, $S_n = \frac{n}{2}[2a + (n-1)d]$

The quadratic equation

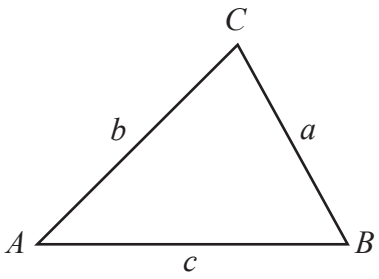
The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$ are given by:

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

Area of trapezium $= \frac{1}{2}(a+b)h$



Trigonometry



In any triangle *ABC*

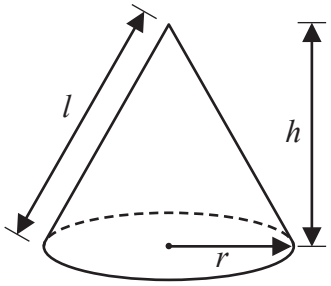
Sine Rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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

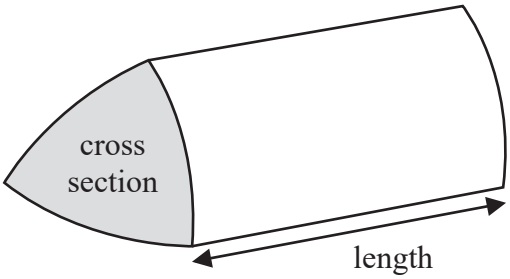
Area of triangle $= \frac{1}{2}ab\sin C$

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

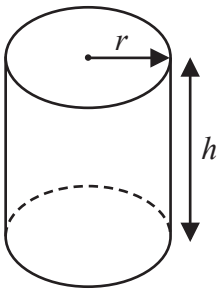
Curved surface area of cone $= \pi r l$



Volume of prism
= area of cross section × length

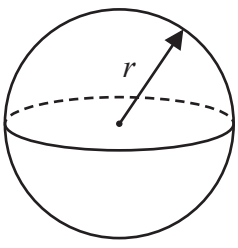


Volume of cylinder $= \pi r^2 h$
Curved surface area of cylinder $= 2\pi r h$



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

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



Answer all TWENTY questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 The table shows information about the weights, in kg, of 40 parcels.

Weight of parcel (p kg)	Frequency
$0 < p \leqslant 1$	19
$1 < p \leqslant 2$	12
$2 < p \leqslant 3$	5
$3 < p \leqslant 4$	2
$4 < p \leqslant 5$	2

(a) Write down the modal class.

.....

(1)

(b) Work out an estimate for the mean weight of the parcels.

..... kg

(4)

(Total for Question 1 is 5 marks)

2 There are some people in a cinema.

$\frac{3}{5}$ of the people in the cinema are children.

For the children in the cinema,

number of girls : number of boys = 2 : 7

There are 170 girls in the cinema.

Work out the number of adults in the cinema.

.....

(Total for Question 2 is 5 marks)

3 (a) Simplify $y^5 \times y^9$

.....

(1)

(b) Simplify $(2m^3)^4$

.....

(2)

(c) Solve $5(x + 3) = 3x - 4$
Show clear algebraic working.

$x =$ .....

(3)

(d) (i) Factorise $x^2 + 2x - 24$

.....

(2)

(ii) Hence, solve $x^2 + 2x - 24 = 0$

.....

(1)

(Total for Question 3 is 9 marks)

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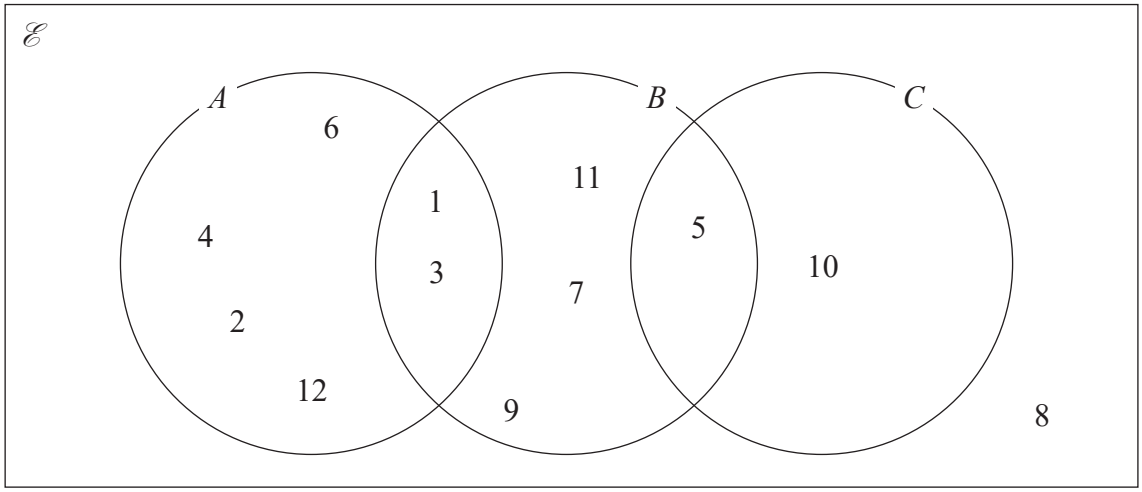
4 Here is a Venn diagram.



(a) Write down the numbers that are in the set

(i) A

.....

(ii) $B \cup C$

.....

(2)

Brian writes down the statement $A \cap C = \varnothing$

(b) Is Brian's statement correct?
You must give a reason for your answer.

.....

.....

(1)

One of the numbers in the Venn diagram is picked at random.

(c) Find the probability that this number is in set C'

.....

(2)

(Total for Question 4 is 5 marks)

5 (a) Write 8×10^4 as an ordinary number.

.....

(1)

(b) Work out $(3.5 \times 10^5) \div (7 \times 10^8)$
Give your answer in standard form.

.....

(2)

(Total for Question 5 is 3 marks)

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6

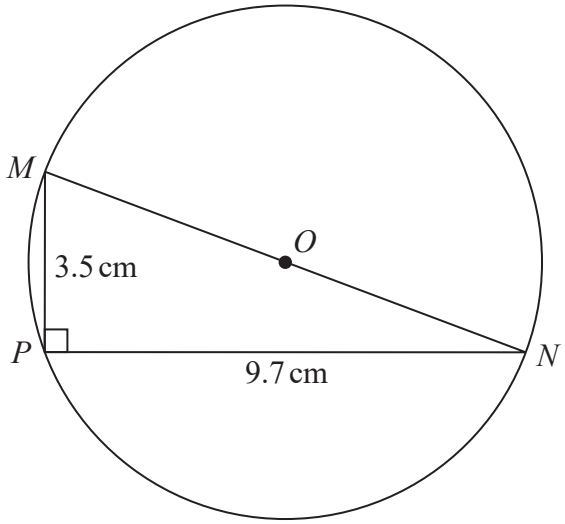


Diagram **NOT** accurately drawn

M, *N* and *P* are points on a circle, centre *O*.
MON is a diameter of the circle.

MP = 3.5 cm
PN = 9.7 cm

Angle *MPN* = 90°

Work out the circumference of the circle.
Give your answer correct to 3 significant figures.

..... cm

(Total for Question 6 is 4 marks)

7 Chao bought a boat for HK$160 000
The value of the boat depreciates by 4% each year.

(a) Work out the value of the boat at the end of 3 years.
Give your answer correct to the nearest HK$.

HK$.....

(3)

Jalina gets a salary increase of 5%
Her salary after the increase is HK$252 000

(b) Work out Jalina's salary before the increase.

HK$.....

(3)

(Total for Question 7 is 6 marks)

8 $A = 3^5 \times 5 \times 7^3$
$B = 2^3 \times 3 \times 7^4$

(a) (i) Find the Highest Common Factor (HCF) of A and B.

.....

(ii) Find the Lowest Common Multiple (LCM) of A and B.

.....

(2)

$A = 3^5 \times 5 \times 7^3$
$B = 2^3 \times 3 \times 7^4$
$C = 2^p \times 5^q \times 7^r$

Given that
the HCF of B and C is $2^3 \times 7$
the LCM of A and C is $2^4 \times 3^5 \times 5^2 \times 7^3$

(b) find the value of p, the value of q and the value of r.

$p =$ .....

$q =$ .....

$r =$ .....

(2)

(Total for Question 8 is 4 marks)

9 The diagram shows a right-angled triangle.

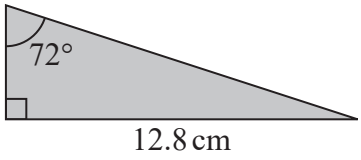


Diagram **NOT** accurately drawn

Five of these triangles are put together to make a shape.

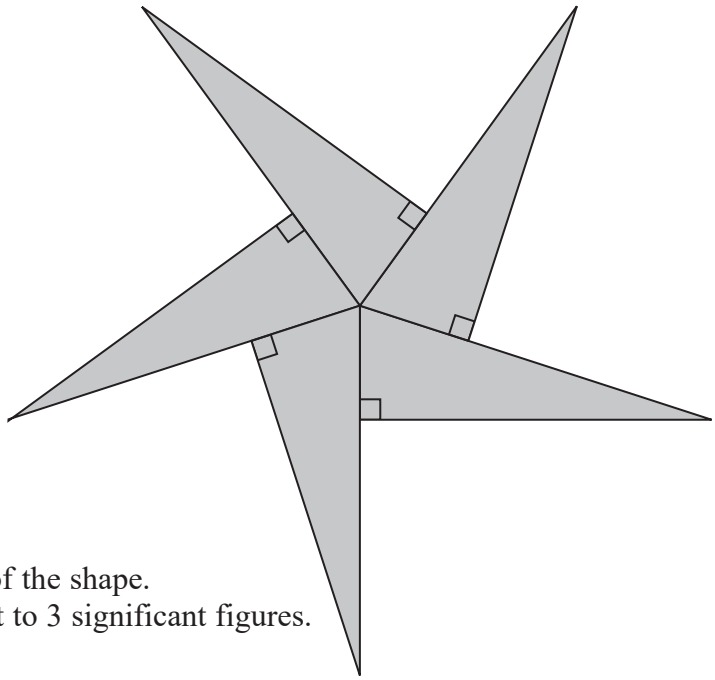


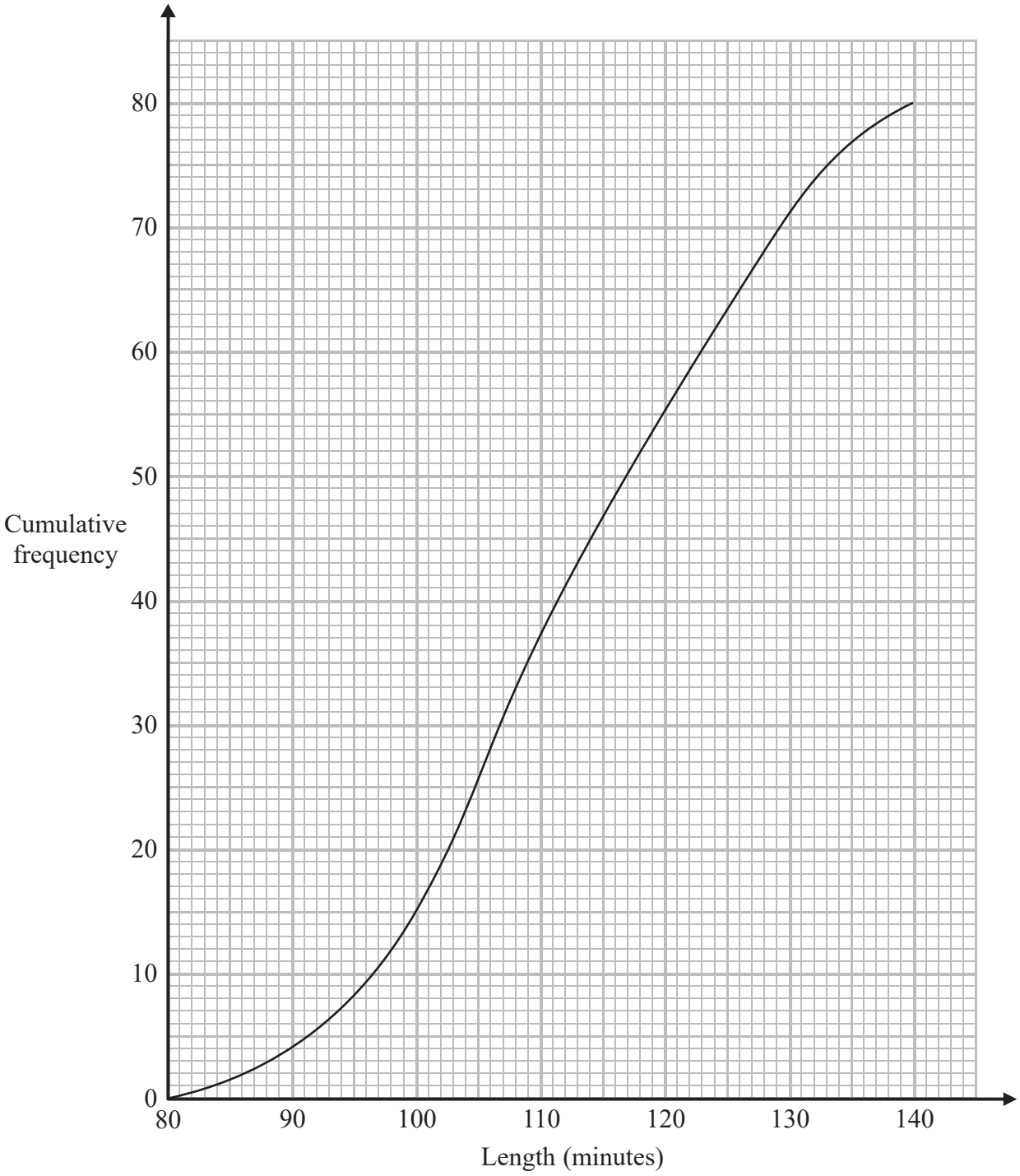
Diagram **NOT** accurately drawn

Calculate the perimeter of the shape.
Give your answer correct to 3 significant figures.

..... cm

(Total for Question 9 is 5 marks)

10 The cumulative frequency graph shows information about the length, in minutes, of each of 80 films.



(a) Use the graph to find an estimate for the interquartile range.

..... minutes

(2)

Clare says,

"More than 35% of these films are over 120 minutes long."

(b) Is Clare correct?
Give a reason for your answer.

.....

.....

(3)

(Total for Question 10 is 5 marks)

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11 (a) Expand and simplify $(2x - 1)(x + 3)(x - 5)$

.....

(3)

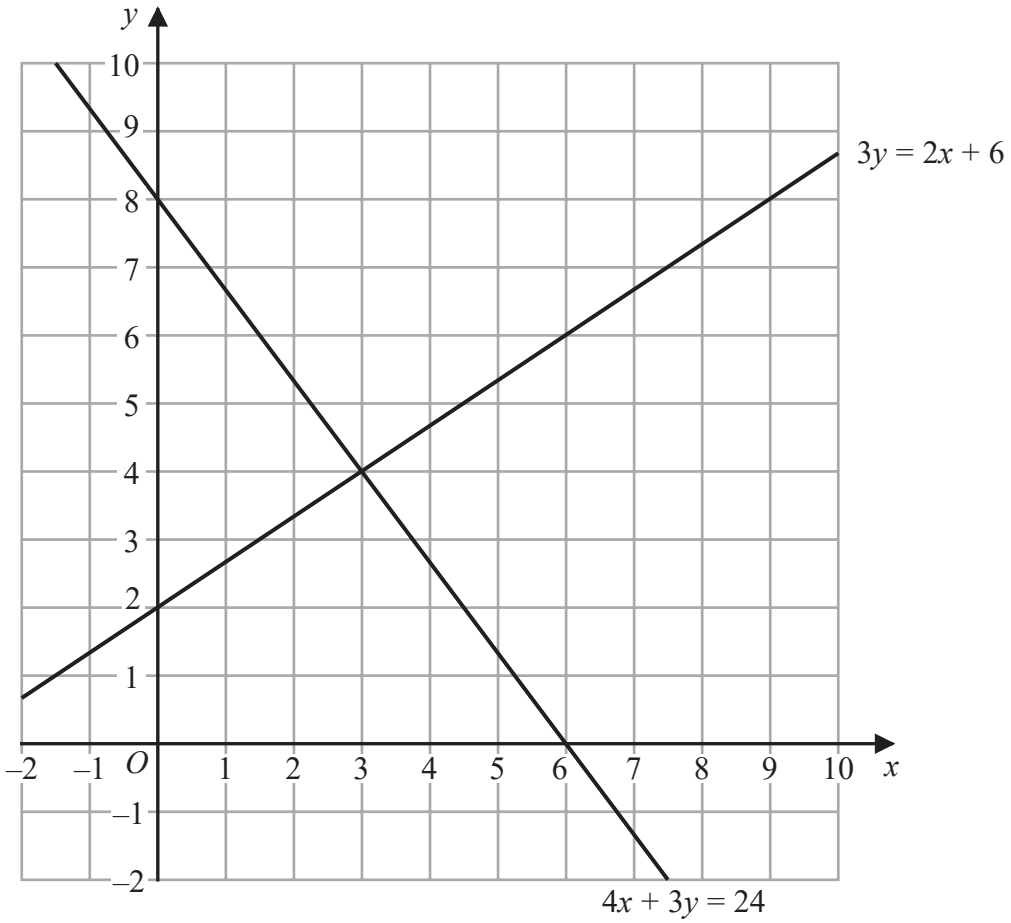
(b) Solve $3x^2 + 6x - 5 = 0$
Show your working clearly.
Give your solutions correct to 3 significant figures.

.....

(3)

(Total for Question 11 is 6 marks)

12 The diagram shows two straight lines drawn on a grid.



(a) Write down the solution of the simultaneous equations

$$3y = 2x + 6$$
$$4x + 3y = 24$$

$x =$ .....

$y =$ .....

(1)

(b) Show, by shading on the grid, the region defined by all five of the inequalities

$x \geqslant 0$ $y \geqslant 0$ $x + y \geqslant 4$ $3y \leqslant 2x + 6$ $4x + 3y \leqslant 24$

Label the region **R**.

(3)

(Total for Question 12 is 4 marks)

13

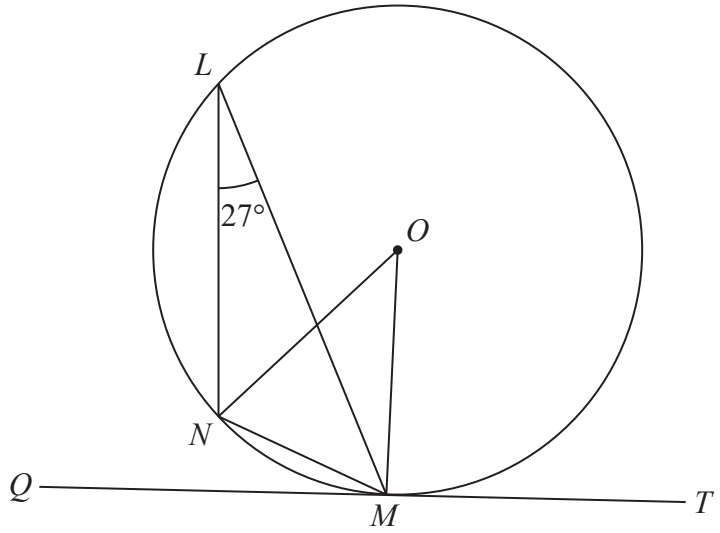


Diagram **NOT** accurately drawn

L, *M* and *N* are points on a circle, centre *O*.
QMT is the tangent to the circle at *M*.

(a) (i) Find the size of angle *NOM*.

.....°

(ii) Give a reason for your answer.

.....

.....

(2)

(b) (i) Find the size of angle *NMQ*.

.....°

(ii) Give a reason for your answer.

.....

.....

(2)

(Total for Question 13 is 4 marks)

14 The function f is such that

$$f(x) = \frac{3x - 5}{4}$$

(a) Find f(–7)

.....

(1)

(b) Express the inverse function f^{-1} in the form $f^{-1}(x) = ...$

$f^{-1}(x) =$ .....

(2)

The function g is such that

$$g(x) = \sqrt{19 - x}$$

(c) Find fg(3)

.....

(2)

(d) Which values of x cannot be included in any domain of g?

.....

(2)

(Total for Question 14 is 7 marks)

15 (a) Simplify fully $\left(\frac{256x^{20}}{y^8}\right)^{-\frac{1}{4}}$

(2)

(b) Express $\frac{1}{9x^2 - 25} - \frac{1}{6x + 10}$ as a single fraction in its simplest form.

(3)

(Total for Question 15 is 5 marks)

16 A frustum is made by removing a small cone from a large cone.
The cones are mathematically similar.

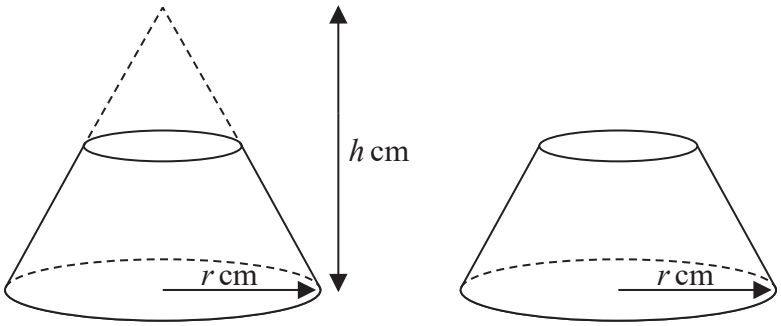


Diagram **NOT** accurately drawn

Frustum

The large cone has base radius r cm and height h cm.

Given that

$$\frac{\text{volume of frustum}}{\text{volume of large cone}} = \frac{98}{125}$$

find an expression, in terms of h, for the height of the frustum.

..... cm

(Total for Question 16 is 4 marks)

17 The diagram shows parallelogram $ABCD$.

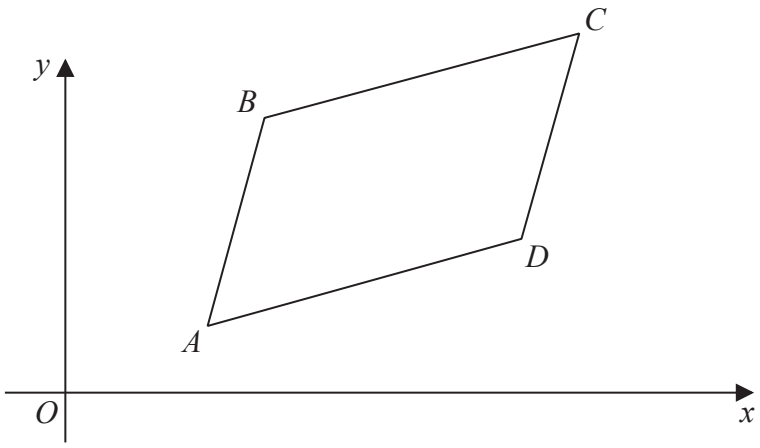


Diagram **NOT** accurately drawn

$\overrightarrow{AB} = \begin{pmatrix} 2 \\ 7 \end{pmatrix}$ $\overrightarrow{AC} = \begin{pmatrix} 10 \\ 11 \end{pmatrix}$

The point B has coordinates (5, 8)

(a) Work out the coordinates of the point C.

(..... , ...)

(3)

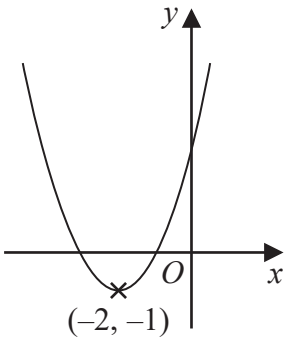
The point E has coordinates (63, 211)

(b) Use a vector method to prove that ABE is a straight line.

(2)

(Total for Question 17 is 5 marks)

18



The diagram shows the curve with equation $y = f(x)$
The coordinates of the minimum point of the curve are (–2, –1)

(a) Write down the coordinates of the minimum point of the curve with equation

(i) $y = f(x - 5)$

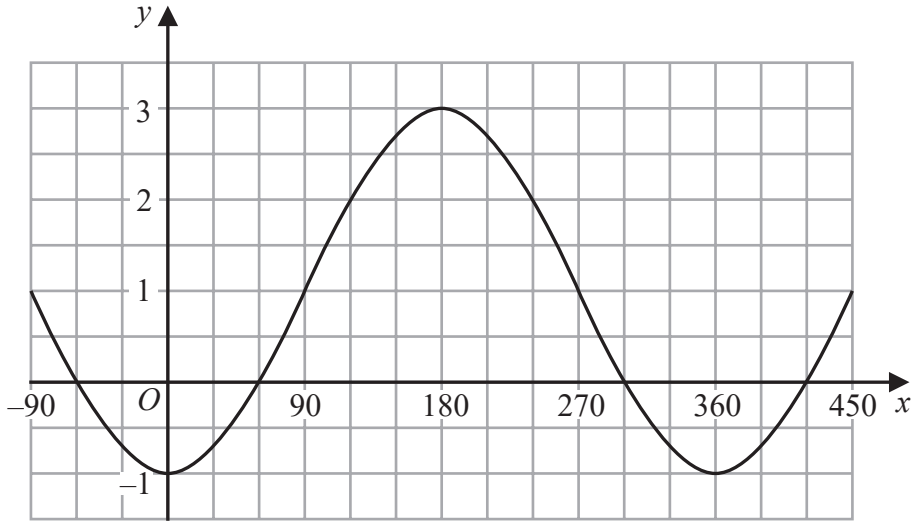
(..... , ...)

(ii) $y = \frac{1}{2} f(x)$

(..... , ...)

(2)

The graph of $y = a\sin(x - b)° + c$ for $-90 \leqslant x \leqslant 450$ is drawn on the grid below.



(b) Find the value of a, the value of b and the value of c.

$a =$ .....

$b =$ .....

$c =$ .....

(3)

(Total for Question 18 is 5 marks)

19 Jack plays a game with two fair spinners, **A** and **B**.

Spinner **A** can land on the number 2 or 3 or 5 or 7
Spinner **B** can land on the number 2 or 3 or 4 or 5 or 6

Jack spins both spinners.
He wins the game if one spinner lands on an odd number **and** the other spinner lands on an even number.

Jack plays the game twice.
Work out the probability that Jack wins the game both times.

.....

(Total for Question 19 is 4 marks)

20 ABC is an isosceles triangle such that

$AB = AC$
A has coordinates (4, 37)
B and C lie on the line with equation $3y = 2x + 12$

Find an equation of the line of symmetry of triangle ABC.
Give your answer in the form $px + qy = r$ where p, q and r are integers.
Show clear algebraic working.

.....

(Total for Question 20 is 5 marks)

TOTAL FOR PAPER IS 100 MARKS

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