AQA

PRACTICE PAPER SET 4

Please write clearly, in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

GCSE MATHEMATICS

H

Higher Tier Paper 2 Calculator

Exam Date Morning Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:

- a calculator
- mathematical instruments.

Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Answer **all** questions.
- You must answer the questions in the spaces 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 you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.

Advice

- In all calculations, show clearly how you work out your answer.

For Examiner's Use	
Pages	Mark
2 - 3	
4 - 5	
6 - 7	
8 - 9	
10 - 11	
12 - 13	
14 - 15	
16 - 17	
18 - 19	
20	
TOTAL	

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

1 Work out $5^{12} \div 5^3 \times 5^2$ as a power of 5

Circle your answer.

[1 mark]

5^6 5^8 5^9 5^{11}

2 Work out $\begin{pmatrix} -4 \\ -7 \end{pmatrix} - \begin{pmatrix} -5 \\ 3 \end{pmatrix}$

Circle your answer.

[1 mark]

$\begin{pmatrix} -9 \\ 4 \end{pmatrix}$ $\begin{pmatrix} 1 \\ 4 \end{pmatrix}$ $\begin{pmatrix} -1 \\ 4 \end{pmatrix}$ $\begin{pmatrix} 1 \\ -10 \end{pmatrix}$ $\begin{pmatrix} -9 \\ -10 \end{pmatrix}$

3 Circle the nth term of the linear sequence 3 7 11 ___

[1 mark]

$n + 4$ $3n + 4$ $4n - 1$ $4n + 3$

4 $f(x) = 8x - 5$

Circle the value of $f(-2)$

[1 mark]

11 -21 -11 1

5 The nth term of a sequence is given by $3n^2$

What is the position of the term in the sequence that is the first one with a value greater than 1000 ?

[3 marks]

Answer _____

Turn over for the next question

7

6 £4000 is invested at 1.5% compound interest.

6 (a) Show that the value of the investment after 2 years is £4120.90

[2 marks]

6 (b) In the third year the interest rate falls to 1.4%

In the fourth year the interest rate falls to 1.35%

Will the interest for year 4 be more or less than the interest for year 3 ?

Tick a box.

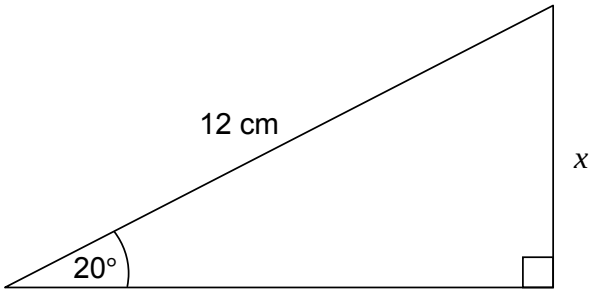
☐ More ☐ Less

You **must** show your working.

[4 marks]

7 Work out the length x.

Not drawn accurately



[2 marks]

Answer _____ cm

8 Write 140 as a product of prime numbers in index form.

[3 marks]

Answer _____

11

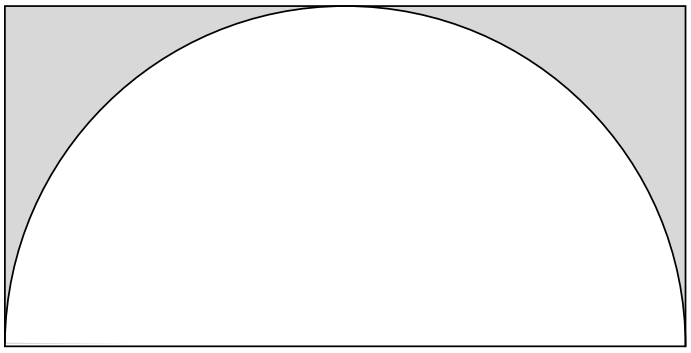
9 Work out the values of a and b in the identity.

$3ax + 6 - 4(x + b) \equiv 11x + 14$

[5 marks]

$a =$ _____ $b =$ _____

10 The diagram shows a semicircle of diameter 14 cm inside a rectangle.



Not drawn accurately

14 cm

Work out the shaded area.

[4 marks]

Answer _____ cm^2

Turn over for the next question

11 The table summarises the amounts spent, £A, by customers in a shop in one hour.

Amount spent, £A	**Number of customers**		
$0 < A \leqslant 10$	18		
$10 < A \leqslant 20$	15		
$20 < A \leqslant 30$	7		
More than 30	0		

11 (a) Work out an estimate of the mean amount spent per customer in one hour.

[4 marks]

Answer £ _____

11 (b) Using the till receipts, the manager works out the actual mean amount spent for each group.

Amount spent, £A	Number of customers	Actual mean amount spent
$0 < A \leqslant 10$	18	£4.50
$10 < A \leqslant 20$	15	£15.00
$20 < A \leqslant 30$	7	£23.40

Without further calculation, decide whether the actual mean of the 40 customers will be different from the estimated mean in part **(a)**.

Tick a box.

☐ Higher ☐ Lower ☐ The same

Give a reason for your answer.

[2 marks]

Turn over for the next question

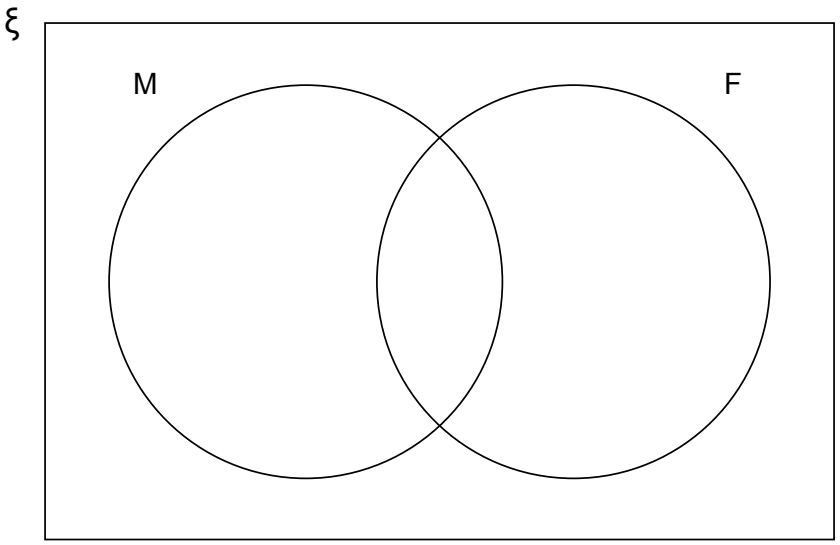
6

12 A whole number from 1 to 15 inclusive is picked at random.

ξ = Whole numbers from 1 to 15 inclusive

M = Multiples of 3

F = Factors of 24



Using the Venn diagram, work out which of these probabilities is greater

P (the number is a multiple of 3 given it is a factor of 24)

or

P (the number is a factor of 24 given it is a multiple of 3)

You **must** show your working.

[5 marks]

Answer _____

13 y is inversely proportional to x for positive values.

When $x = 3.5$, $y = 4.2$

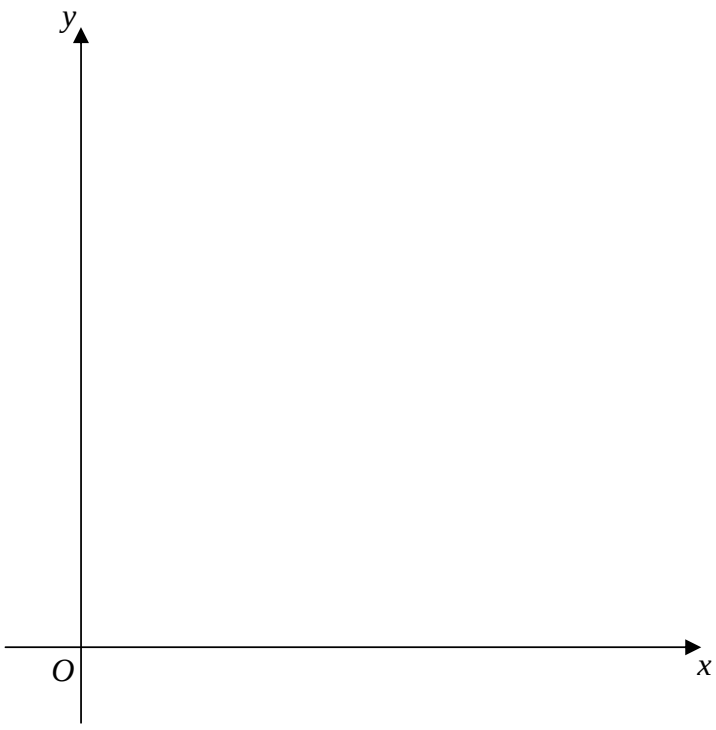
13 (a) Work out the value of y when $x = 5.6$

[3 marks]

Answer _____

13 (b) On the grid draw a sketch to show the relationship between y and x.

[1 mark]



9

14 (a) The product of $a \times 10^b$ and 3.8×10^6 is 2.318×10^3

Work out the values of a and b.

[3 marks]

$a =$ _____

$b =$ _____

14 (b) Write down a number in standard form that is more than 20 million and less than 30 million.

[2 marks]

Answer _____

15 $E = 25 + 2p - pq$

When $E = 1$ and $q = p$ work out the values of p.

[4 marks]

Answer _____

Turn over for the next question

9

16 Sofi is competing in a long jump competition.

Her first jump is 5.25 m

Her best jump is 8% more than this.

However, her best jump is 10% lower than the winning jump.

Work out the length of the winning jump.

[4 marks]

Answer _____ m

17 (a) What is the equation of a circle with centre (0, 0) and diameter 6 units?

Circle your answer.

[1 mark]

$x^2 + y^2 = 3$ $x^2 + y^2 = 6$ $x^2 + y^2 = 9$ $x^2 + y^2 = 36$

17 (b) Which of these points lie on the circumference of the circle $x^2 + y^2 = 25$?

Circle your answer.

[1 mark]

(–3, 4) (6.25, 6.25) (9, 16) (–1, 12)

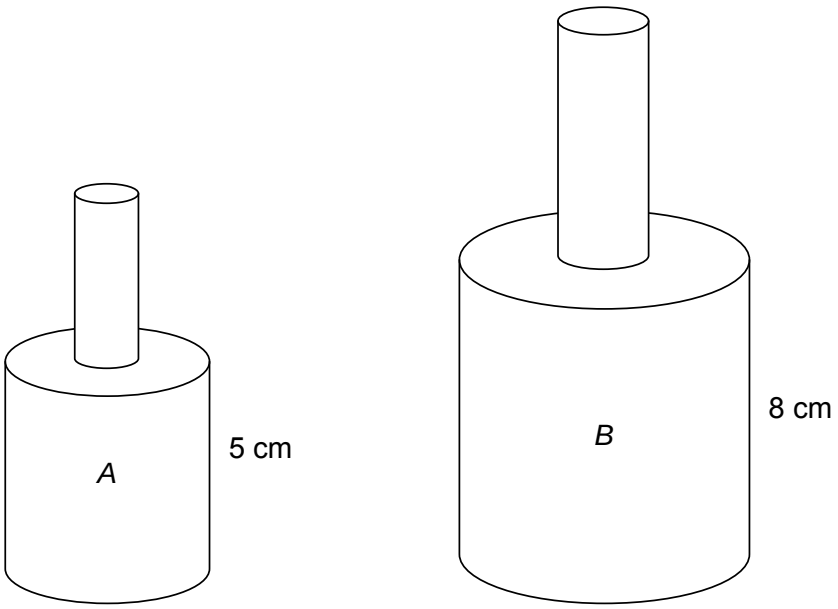
17 (c) Circle True (T) or False (F) for each statement.

[2 marks]

The centre of the circle $x^2 + y^2 = 25$ is (0, 0)	T	F
The equation of the tangent to the circle $x^2 + y^2 = 25$ at the point (5, 0) is $y = 5$	T	F
The equation of a circle and the equation of a straight line can have 0, 1 or 2 solutions if solved simultaneously	T	F

8

18 Here are two similar solids, *A* and *B*.



The volume of *B* is 400 cm^3

Is the volume of *A* approximately one quarter of the volume of B?

You **must** show your working.

[4 marks]

Answer _____

19 Curved surface area of a cone $= \pi rl$ where r is the radius and l is the slant height.

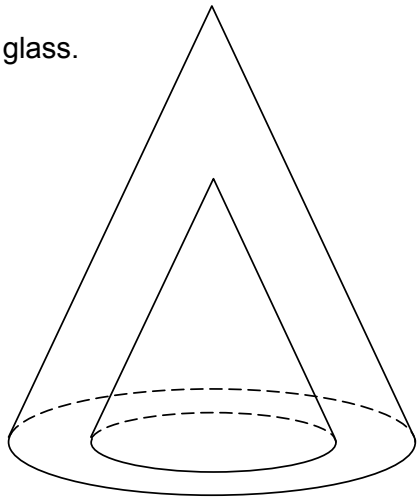
The diagram shows a hollow cone made from thick glass.

The radius of the **outer** cone is 10 cm

The slant height of the **outer** cone is 25 cm

The radius of the **inner** cone is 5 cm

The slant height of the **inner** cone is 12.5 cm



Work out the **total** surface area of the glass.

[5 marks]

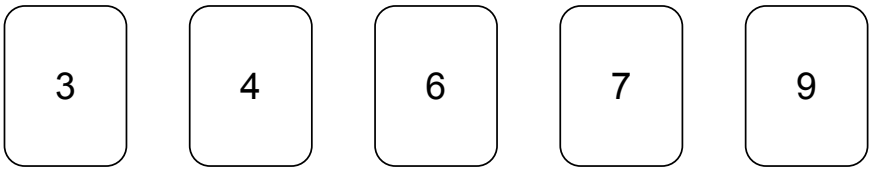
Answer _____ cm^2

9

20 Prove that $3(x + 1)(x + 7) - (2x + 5)^2$ is never positive.

[5 marks]

21 Lucy makes 5-digit numbers using all of these cards.



How many different numbers greater than 50 000 can she make?

[3 marks]

Answer _____

Turn over for the next question

8

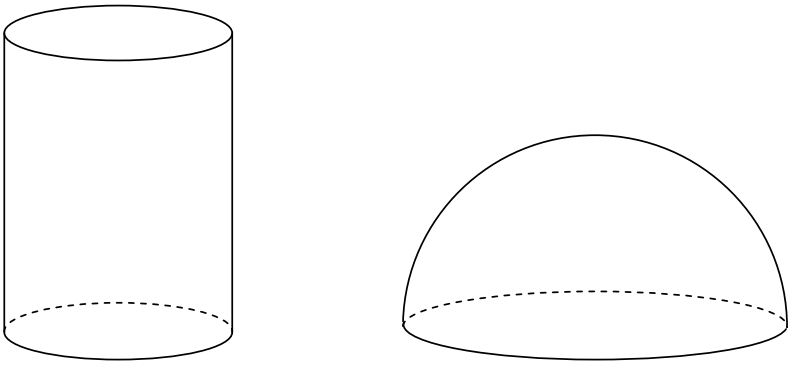
22

Volume of a sphere $= \frac{4}{3}\pi r^3$ where r is the radius.

A cylinder has radius x and height h.

A hemisphere has radius $\frac{3x}{2}$

$x : h = 4 : 9$



Prove that the cylinder and the hemisphere have the same volume.

[4 marks]

END OF QUESTIONS

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