AQA

PRACTICE PAPER SET 3

Please write clearly in block capitals.

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

Surname _____

Forename(s) _____

Candidate signature _____

GCSE MATHEMATICS

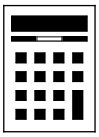
H

Higher Tier Paper 2 Calculator

Date of Exam 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.

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

1 The equation of a line is $y = 2x - 1$

Circle the point that is the intercept with the y-axis.

[1 mark]

(0, –1) (–1, 0) (0, $\frac{1}{2}$) ($\frac{1}{2}$, 0)

2 Simplify $\frac{a^4 \times a^6}{a^3}$

Circle your answer.

[1 mark]

a^7 a^8 a^{21} a^6

3 A coin is thrown 50 times.

The coin lands on heads 30 times.

Circle the relative frequency of landing on heads.

[1 mark]

30 3 : 5 30% $\frac{3}{5}$

4 A number, x, is 15.8 when rounded to 3 significant figures.

Circle the error interval.

[1 mark]

$15.75 < x < 15.85$ $15.75 \leqslant x < 15.85$

$15.75 < x \leqslant 15.85$ $15.75 \leqslant x \leqslant 15.85$

5 (a) Expand and simplify $(x + 5)(x - 4)$

[2 marks]

Answer _____

5 (b) Solve $(x - 8)(x + 7) = 0$

[1 mark]

Answer _____

6 Dev invests £1500 for 2 years.
The compound interest rate is 1.6% per year.

6 (a) Which calculation works out the total value after 2 years?
Circle your answer.

[1 mark]

£1500 × 1.6 × 2 £1500 × 1.6^2

£1500 × 1.016 × 2 £1500 × 1.016^2

6 (b) Emma invests £1500 for 2 years.

The interest rate is

1.8% for the first year

1.3% for the second year.

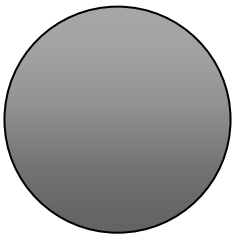
Whose investment is worth more after 2 years?
You **must** show your working.

[4 marks]

Answer _____

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

A steel sphere, radius 9 cm, is shown.



7 (a) Work out the volume of the sphere.

[2 marks]

Answer _____ cm^3

7 (b) The density of the steel is 7.8 grams/cm^3

Work out the mass of the sphere.

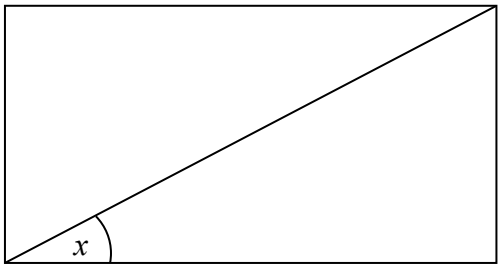
[2 marks]

Answer _____ grams

Turn over for the next question

8 The area of the rectangle is 68 cm^2

Not drawn accurately



16 cm

Work out the size of angle x.

[3 marks]

Answer _____ degrees

9 Which number is **not** in standard form?

Circle your answer.

[1 mark]

1.01×10^9 0.99×10^{-2} 9.8×10^6 4.632×10^{-5}

10 A charity collection was made.

Information about the amounts given by men is shown in the table.

Amount, x (£)	**Midpoint**	**Number of men**	
$0 \leqslant x < 5$		11	
$5 \leqslant x < 10$		7	
$10 \leqslant x < 15$		2	
		Total = 20	

The mean amount given by **women** was £6.30 per person.

Compare the mean amounts given by men and women.

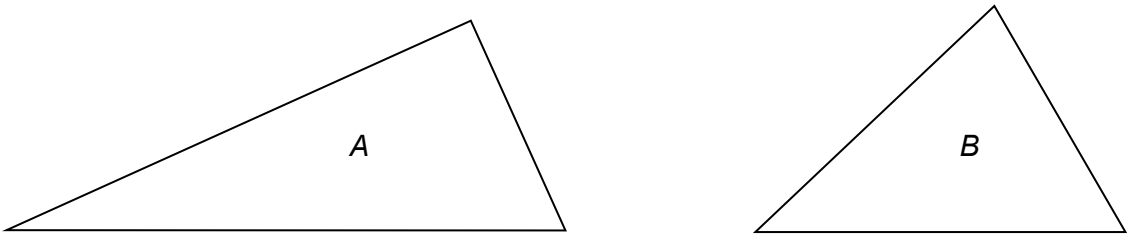
[4 marks]

Turn over for the next question

11 The angles in triangle *A* are in the ratio 1 : 2 : 3

The angles in triangle *B* are in the ratio 4 : 5 : 6

Not drawn accurately



Jack says,

"The middle number in each ratio is one third of the total, so one of the angles in each triangle is 60 degrees"

Is he correct?

Show working to support your answer.

[2 marks]

12 In a class, the ratio boys : girls is $x : y$

Circle the fraction of the class that are girls.

[1 mark]

$\frac{x}{y}$ $\frac{y}{x}$ $\frac{x}{x+y}$ $\frac{y}{x+y}$

13 The price of a computer is reduced by 17.5%

The reduced price is £264

By how much is the price reduced?

[4 marks]

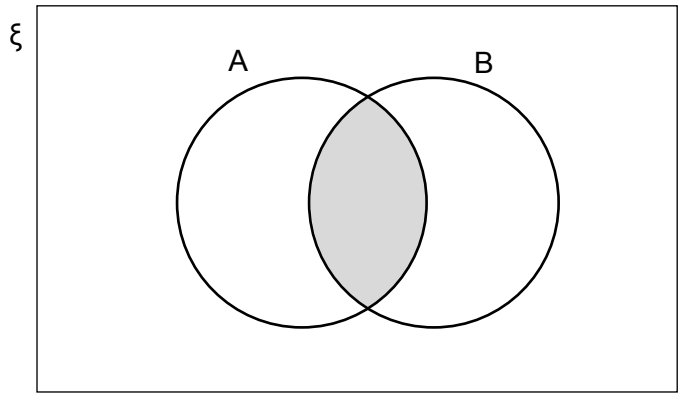
Answer £ _____

14 ξ = numbers between 0 and 1 with 3 decimal places

A = numbers that round to 0.7 to 1 decimal place

B = numbers that round to 0.75 to 2 decimal places

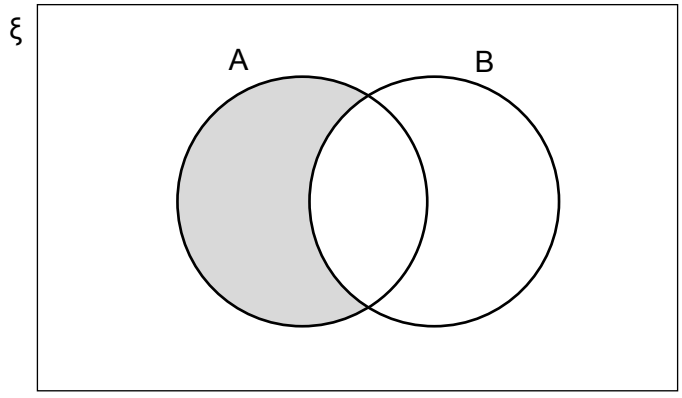
14 (a) Work out a possible number, with 3 decimal places, that is in the shaded area.



[1 mark]

Answer _____

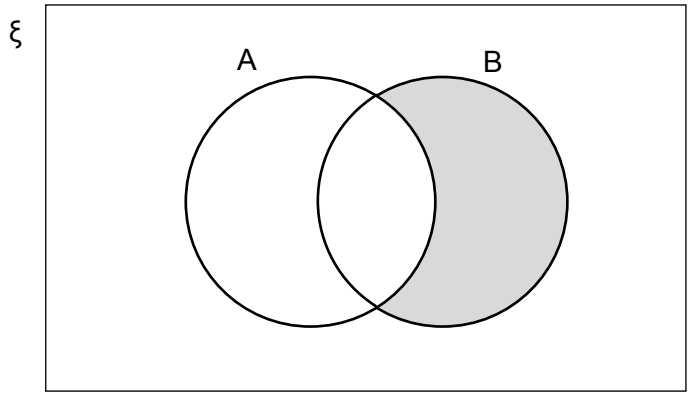
14 (b) Work out a possible number, with 3 decimal places, that is in the shaded area.



[1 mark]

Answer _____

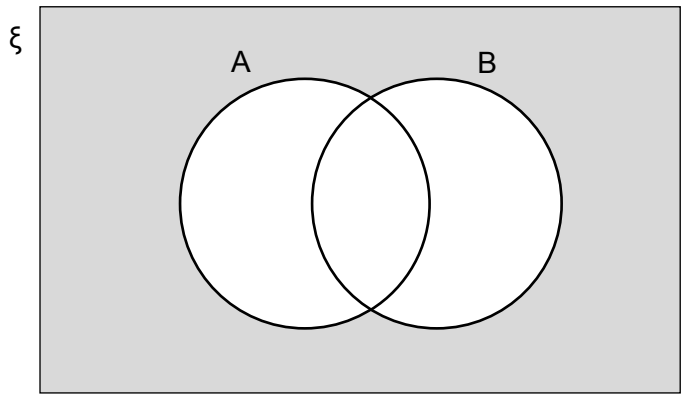
14 (c) Work out a possible number, with 3 decimal places, that is in the shaded area.



[1 mark]

Answer _____

14 (d) Work out a possible number, with 3 decimal places, that is in the shaded area.



[1 mark]

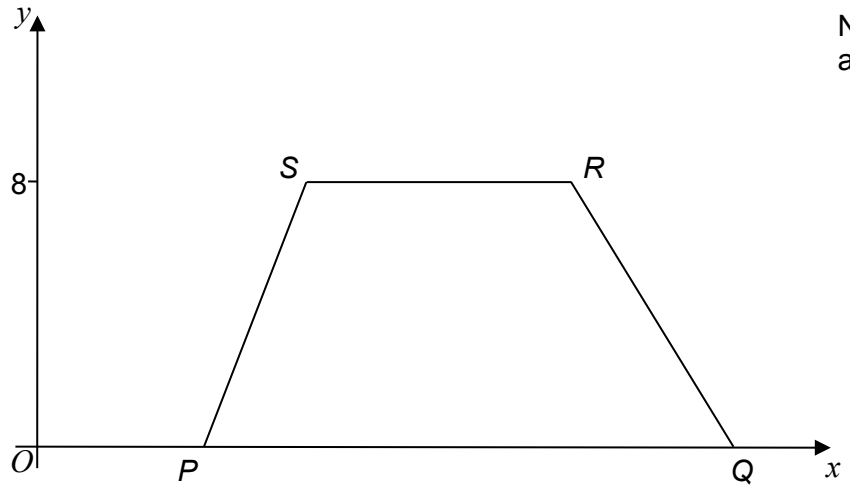
Answer _____

15 *PQRS* is a trapezium with *PQ* parallel to *SR*.

P and *Q* are on the x-axis.

The y-coordinate of *S* is 8

PQ > *SR*



Not drawn accurately

The area of *PQRS* is 48 square units.

Work out one possible set of points for *P*, *Q*, *R* and *S*.

[4 marks]

P (_____ , _____)

Q (_____ , _____)

R (_____ , _____)

S (_____ , _____)

16 (a) I am thinking of two different numbers.

They are both greater than 10

Their highest common factor (HCF) is half the smaller number.

Work out one possible pair of numbers.

[1 mark]

Answer _____ and _____

16 (b) a, b and c are prime numbers.

$$N = a^3 \times b^2 \times c$$

Is N always odd?

Tick a box.

Yes ☐ No ☐

Give reasons for your answer.

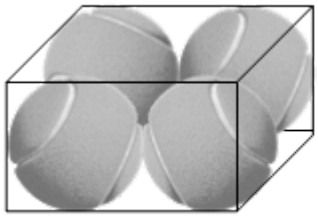
[2 marks]

17 Here are two closed containers.

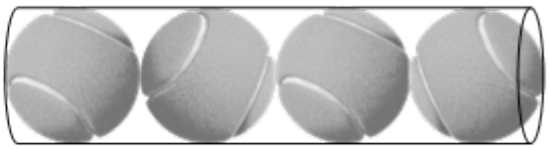
Four tennis balls just fit in each container.

Each tennis ball has diameter 64 mm

Cuboid



Cylinder



Which container has the smaller surface area?

You **must** show your working.

[5 marks]

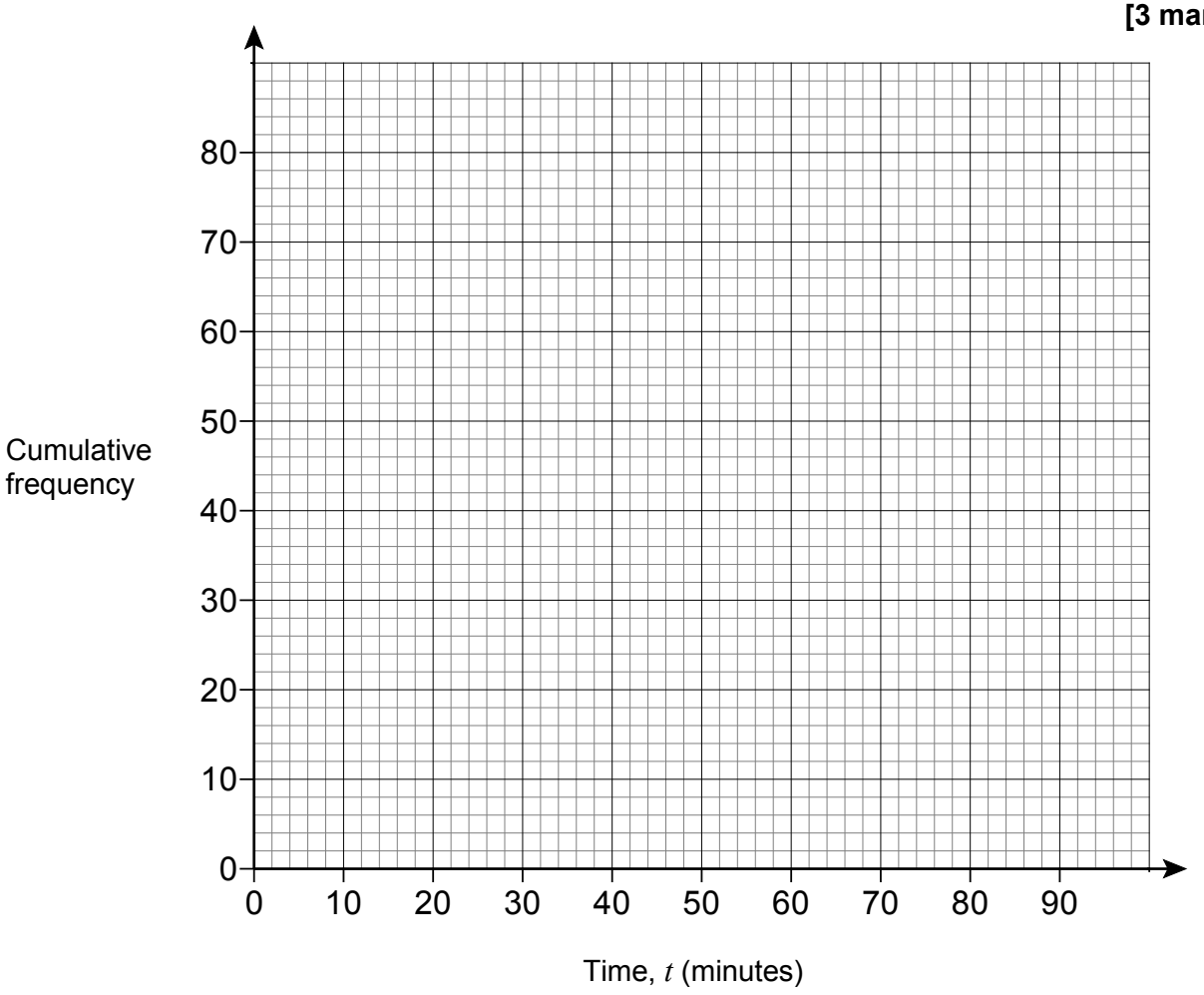
Answer _____

18 Here is some information about the times, in minutes, 80 teachers took to get to work.

Time t (minutes)	Frequency
$0 < t \leqslant 20$	12
$20 < t \leqslant 40$	32
$40 < t \leqslant 60$	25
$60 < t \leqslant 90$	11

18 (a) On the grid, draw a cumulative frequency graph.

[3 marks]



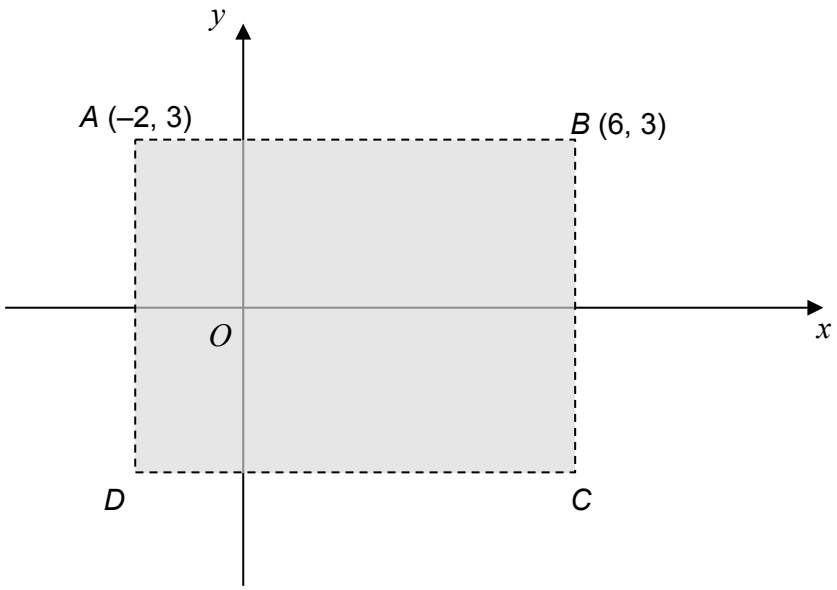
18 (b) Estimate the number of teachers who took between 50 minutes and 70 minutes to travel to work.

[2 marks]

Answer _____

19 (a) *ABCD* is a rectangle.

The x-axis is a line of symmetry.



Not drawn accurately

These inequalities describe the shaded region.

$p < x < q$ and $r < y < s$

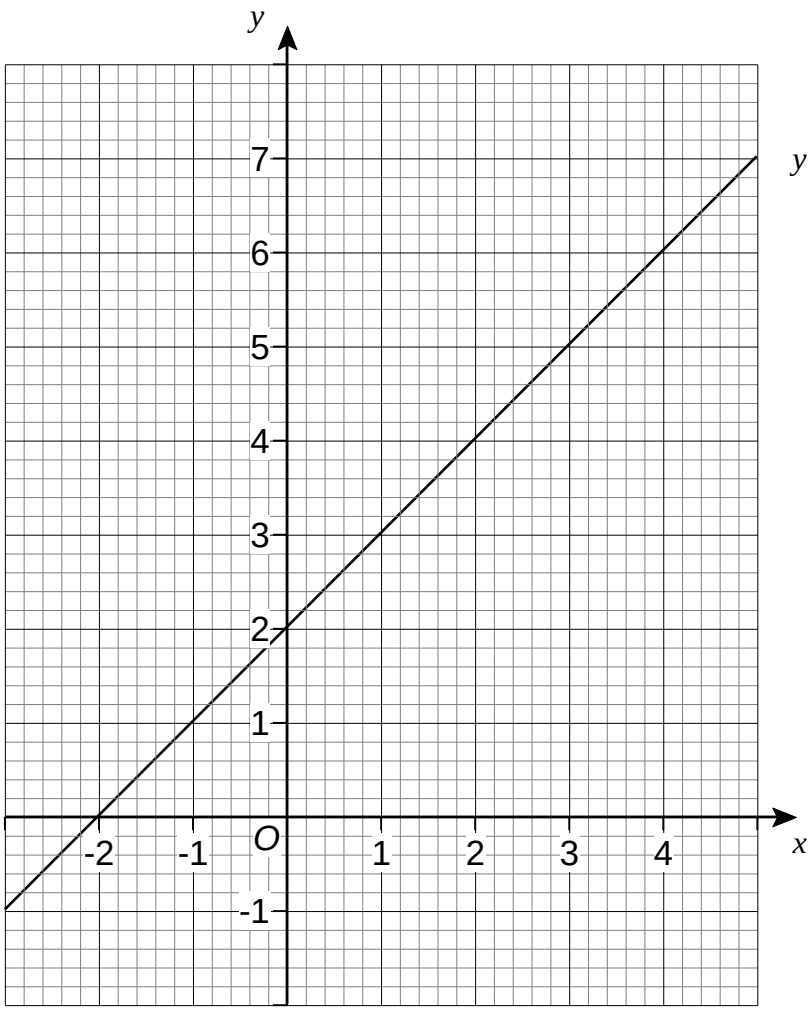
Write down the values of p, q, r and s.

[2 marks]

p = _____ q = _____

r = _____ s = _____

19 (b) The grid shows the graph of $y = x + 2$



On the grid, identify the region represented by

$y \leqslant x + 2$ and $y > 3 - x$ and $x \leqslant 3$

Label the region R.

[3 marks]

Turn over for the next question

20 $f(x) = 3^{2x}$ and $g(x) = x^3$ for all values of x.

20 (a) Work out the value of $f(1) + g(4)$

[2 marks]

Answer _____

20 (b) Work out the value of $g^{-1}(-27)$

[2 marks]

Answer _____

20 (c) Work out an expression for $gf(x)$

Give your answer as a power of 3 in its simplest form.

[2 marks]

Answer _____

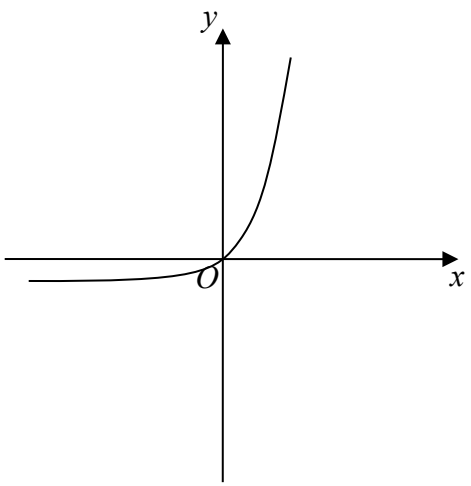
20 (d) One of these graphs is a sketch of $y = 3^{2x}$

Which one?

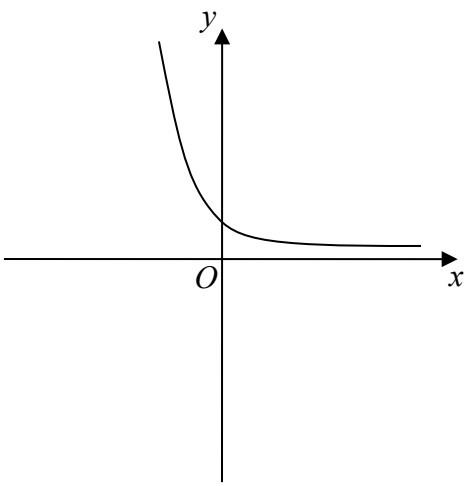
Circle the correct letter.

[1 mark]

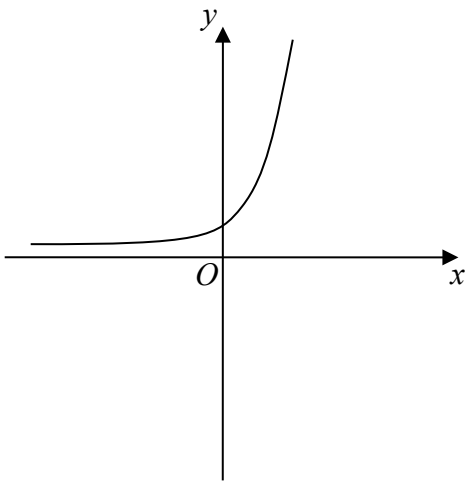
A



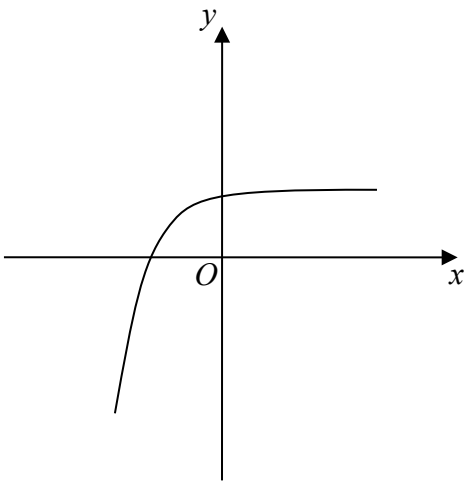
B



C



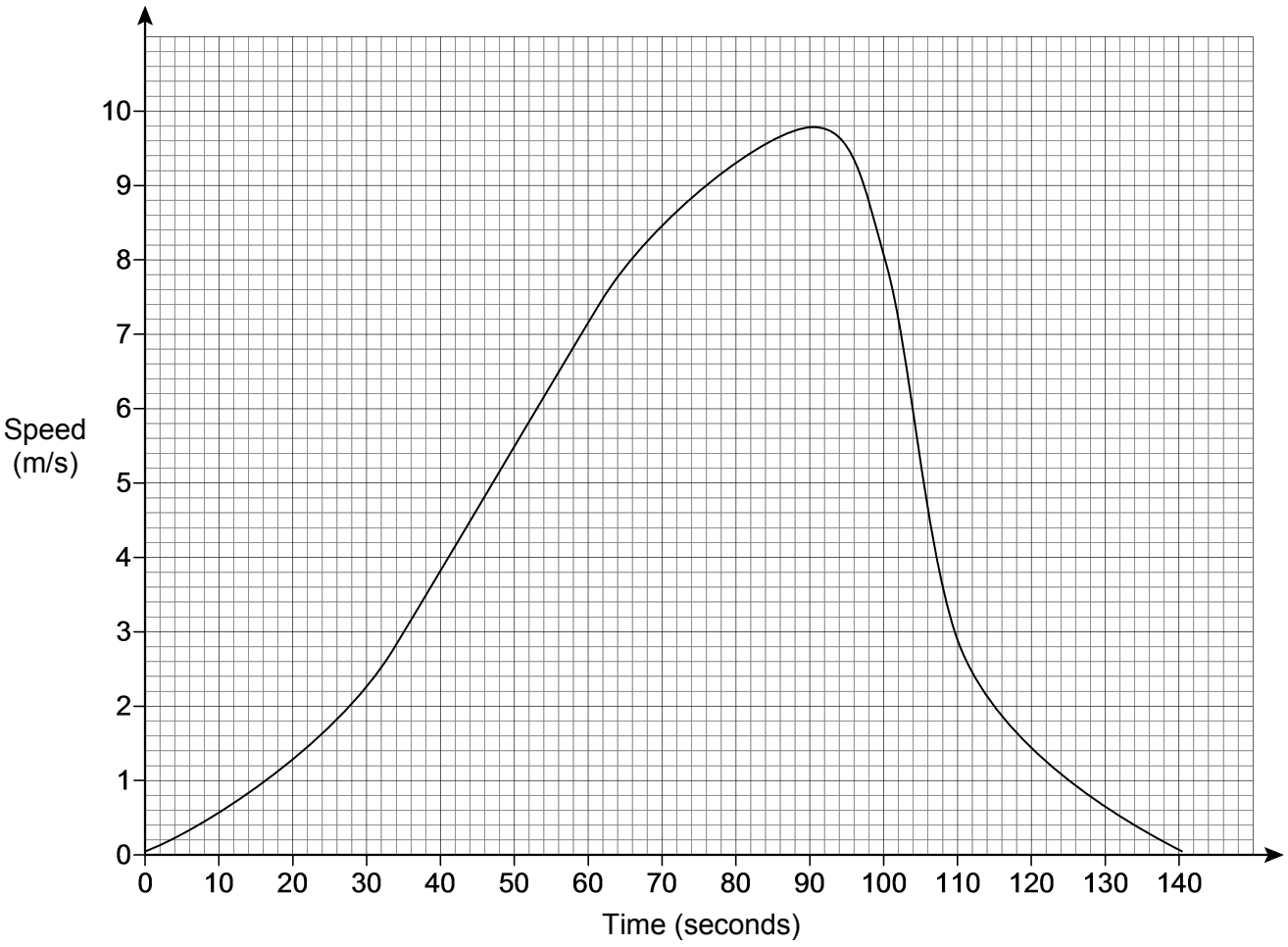
D



Turn over for the next question

21 The graph shows the speed of a skier.

Nick wants to estimate the distance travelled by the skier in 140 seconds.



21 (a) He works out the area of the triangle with vertices (0, 0), (140, 0) and (90, 9.8)

Does Nick's method give a good estimate?

Tick a box.

Yes ☐ No ☐

Give a reason for your answer.

[2 marks]

21 (b) Use Nick's method to work out an estimate of the distance.

[1 mark]

Answer _____ metres

21 (c) Helen uses a different method.

She starts by estimating how many of the smallest squares are in the region between the graph and the horizontal axis.

Her estimate is 1550 squares.

Complete Helen's method to estimate the distance.

[2 marks]

Answer _____ metres

Turn over for the next question

22 The value of a car, £V, after t years, is modelled by the equation

$$V = A \times k^{-t}$$ where A and k are constants.

The value of the car when new was £22 000

The value of the car after 2 years is £14 080

Work out the values of A and k.

[4 marks]

A = _____

k = _____

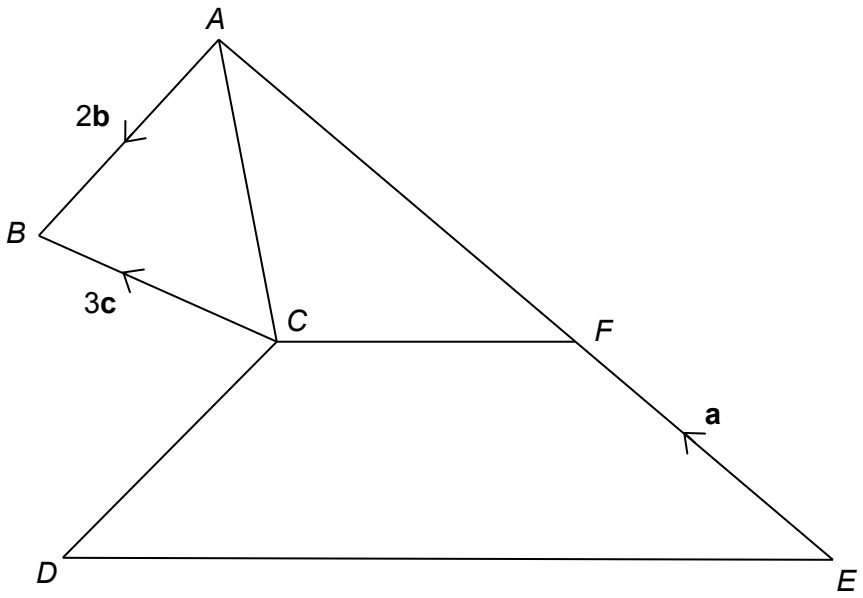
23 *AFE* is a straight line.

AF : *FE* = 3 : 2

DE is parallel to *CF.*

DE = 2*CF*

$\overrightarrow{EF} = \mathbf{a}$ $\overrightarrow{AB} = 2\mathbf{b}$ $\overrightarrow{CB} = 3\mathbf{c}$



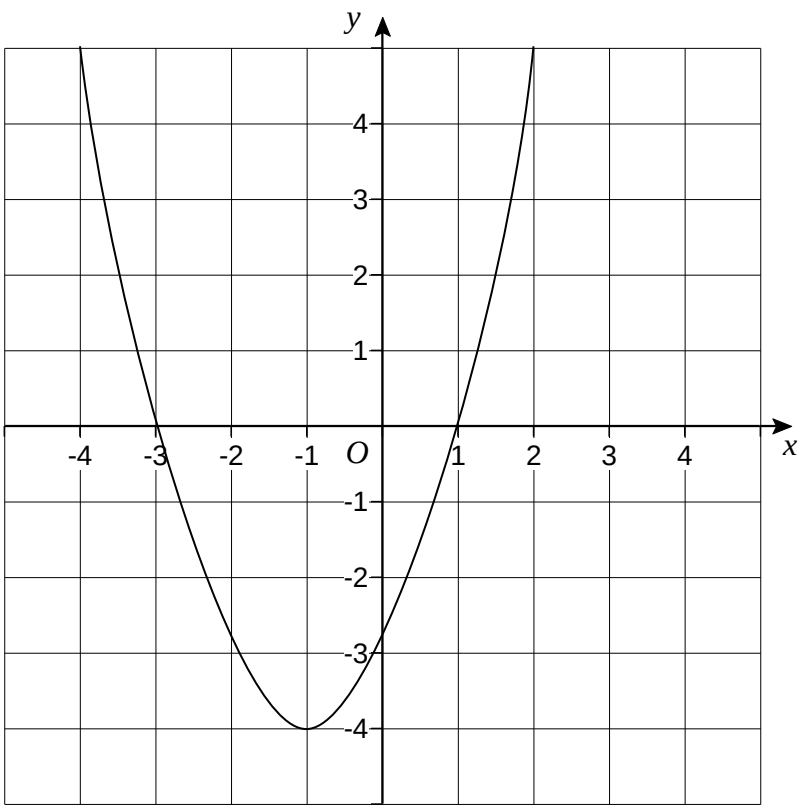
Work out $\overrightarrow{DE}$ in terms of **a**, **b** and **c**.

[4 marks]

Answer _____

24 (a) Here is the graph of $y = f(x)$

The graph has a turning point at (–1, –4)



On the grid, draw the graph of $y = f(x – 2)$

[1 mark]

24 (b) The graph of $y = -3x^2 + 4x - 5$ is reflected in the y-axis.

Work out the equation of the reflected graph.

Give your answer in its simplest form.

[2 marks]

Answer _____

END OF QUESTIONS

There are no questions printed on this page

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