Edexcel GCSE
Mathematics (Linear) – 1MA0

STANDARD FORM

Materials required for examination
Ruler graduated in centimetres and
millimetres, protractor, compasses,
pen, HB pencil, eraser.
Tracing paper may be used.

Items included with question papers
Nil

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.
Calculators may be used.

Information

The marks for each question are shown in brackets – use this as a guide as to how much time to
spend on **each** question.
Questions labelled with an **asterisk** (*) are ones where the quality of your written communication
will be assessed – you should take particular care on these questions with your spelling, punctuation
and grammar, as well as the clarity of expression.

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.

1. (a) Write the number 0.00037 in standard form.

(1)

~~3.7×10⁴~~ 3.7×10^{-4}

(b) Write 8.25×10^{3} as an ordinary number.

(1)

8250

(c) Work out $(2.1 \times 10^{8}) \times (6 \times 10^{-5})$.
     Write your answer in standard form.

$2.1 \times 10^{8} \times 6 \times 10^{-5}$

$= 12.6 \times 10^{3}$

$= 1.26 \times 10^{4}$

1.26×10^{4}

(2)

(4 marks)

2. (a) Write 6.43×10^{5} as an ordinary number.

643000

(1)

(b) Work out the value of $2 \times 10^{7} \times 8 \times 10^{-12}$
     Give your answer in standard form.

$2 \times 10^{7} \times 8 \times 10^{-12}$

$= 16 \times 10^{-5}$

$= 1.6 \times 10^{-4}$

1.6×10^{-4}

(2)

(3 marks)

3. (a) Write down the value of 10^0

    ....1.................................

    (1)

    (b) Write 6.7×10^{-5} as an ordinary number.

    ....0.000067...............

    (1)

    (c) Work out the value of $(3 \times 10^7) \times (9 \times 10^6)$
         Give your answer in standard form.

    $3 \times 10^7 \times 9 \times 10^6$

    $= 27 \times 10^{13}$

    $= 2.7 \times 10^{14}$

    ....2.7×10^{14}...............

    (2)

    (4 marks)

4. (a) Write 8.2×10^5 as an ordinary number.

    ....820000...............

    (1)

    (b) Write 0.000 376 in standard form.

    ....3.76×10^{-4}...............

    (1)

    (c) Work out the value of $(2.3 \times 10^{12}) \div (4.6 \times 10^3)$
         Give your answer in standard form.

    $\dfrac{2.3 \times 10^{12}}{4.6 \times 10^3} = 0.5 \times 10^9$

    $= 5 \times 10^8$

    ....5×10^8...............

    (2)

    (4 marks)

5. A floppy disk can store 1 440 000 bytes of data.

   (a) Write the number 1 440 000 in standard form.

   ....1.44×10^6............

   (1)

   A hard disk can store 2.4×10^9 bytes of data.

   (b) Calculate the number of floppy disks needed to store the 2.4×10^9 bytes of data.

   $2.4 \times 10^9 \div 1.44 \times 10^6 = 1666.\dot{6}$

   ....1667 floppy discs needed.............

   (3)

   (4 marks)

6. (a) (i) Write 40 000 000 in standard form.

   ....4×10^7............

   (ii) Write 3×10^{-5} as an ordinary number.

   ....0.000 03............

   (2)

   (b) Work out the value of

   $$3 \times 10^{-5} \times 40\ 000\ 000$$

   Give your answer in standard form.

   $3 \times 10^{-5} \times 4 \times 10^7$

   $= 12 \times 10^2$

   $= 1.2 \times 10^3$

   ....1.2×10^3............

   (2)

   (4 marks)

7. (a) Write the number 40 000 000 in standard form.

4×10^7

(1)

(b) Write 1.4×10^{-5} as an ordinary number.

0.000014

(1)

(c) Work out

$$(5 \times 10^4) \times (6 \times 10^9)$$

Give your answer in standard form.

$5 \times 10^4 \times 6 \times 10^9$
$= 30 \times 10^{13}$
$= 3 \times 10^{14}$

3×10^{14}

(2)

(4 marks)

8. (a) Write 6.4×10^4 as an ordinary number.

64000

(1)

(b) Write 0.0039 in standard form.

3.9×10^{-3}

(1)

(c) Write 0.25×10^7 in standard form.

2.5×10^6

(1)

(d) Work out $(3.2 \times 10^5) \times (4.5 \times 10^4)$ in standard form.

$3.2 \times 10^5 \times 4.5 \times 10^4$
$= 14.4 \times 10^9$
$= 1.44 \times 10^{10}$

1.44×10^{10}

(2)

(5 marks)

9. (a) (i) Write 7900 in standard form.

.... 7.9×10^3 ....

    (ii) Write 0. 00035 in standard form.

.... 3.5×10^{-4} ....

(2)

    (b) Work out $\dfrac{4 \times 10^3}{8 \times 10^{-5}}$

    Give your answer in standard form.

$$\dfrac{4 \times 10^3}{8 \times 10^{-5}} = 0.5 \times 10^8$$
$$= 5 \times 10^7$$

.... 5×10^7 ....

(2)
(4 marks)

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10. (a) Write 30 000 000 in standard form.

.... 3×10^7 ....

(1)

    (b) Write 2×10^{-3} as an ordinary number.

.... 0.002 ....

(1)
(2 marks)

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11. (a) Write 5.7×10^{-4} as an ordinary number.

.... 0.00057 ....

(1)

    (b) Work out the value of $(7 \times 10^4) \times (3 \times 10^5)$

    Give your answer in standard form.

$7 \times 10^4 \times 3 \times 10^5$
$= 21 \times 10^9$
$= 2.1 \times 10^{10}$

.... 2.1×10^{10} ....

(2)
(3 marks)

12. Write the following numbers in order of size.
Start with the smallest number.

$$0.038 \times 10^2 \qquad 3800 \times 10^{-4} \qquad 380 \qquad 0.38 \times 10^{-1}$$

$3.8 \times 10^0 \qquad 3.8 \times 10^{-1} \qquad 3.8 \times 10^2 \qquad 3.8 \times 10^{-2}$

$0.38 \times 10^{-1}, \quad 3800 \times 10^{-4}, \quad 0.038 \times 10^2, \quad 380$

(2 marks)

13. The time taken for light to reach Earth from the edge of the known universe is 14 000 000 000 years.

Light travels at the speed of 9.46×10^{12} km/year.

Work out the distance, in kilometres, from the edge of the known universe to Earth.
Give your answer in standard form.

$S = \dfrac{D}{T}$

$D = ST$

$D = 9.46 \times 10^{12} \times 1.4 \times 10^{10}$

$= 13.244 \times 10^{22}$

$= 1.3244 \times 10^{23}$

1.3244×10^{23} .... km

(3 marks)

14. The surface area of Earth is 510 072 000 km².
The surface area of Jupiter is 6.21795×10^{10} km².

The surface area of Jupiter is greater than the surface area of Earth.
How many times greater?
Give your answer in standard form.

$6.21795 \times 10^{10} \div 5.10072 \times 10^8 = 121.903378\ldots$

$= 1.21903 \times 10$

$= 122 \quad (3sf)$

$= 1.22 \times 10^2 \quad (3sf)$

$1.22 \times 10^2 \quad (3sf)$ ....

(3 marks)

15.

$$p^2 = \frac{x - y}{xy}$$

$x = 8.5 \times 10^9$
$y = 4 \times 10^8$

Find the value of p.
Give your answer in standard form correct to 2 significant figures.

$$p^2 = \frac{8.5 \times 10^9 - 4 \times 10^8}{8.5 \times 10^9 \times 4 \times 10^8} = \frac{8.1 \times 10^9}{3.4 \times 10^{18}}$$

$$= 2.38235... \times 10^{-9}$$

$$= 2.4 \times 10^{-9} \ (2sf).$$

$$p = \sqrt{2.38235... \times 10^{-9}}$$

$$= 4.880935... \times 10^{-5}$$

$$= 4.9 \times 10^{-5} \ (2sf)$$

$4.9 \times 10^{-5} \ (2sf)$
~~2.4 × 10~~.

(4 marks)

16.

$$y^2 = \frac{ab}{a + b}$$

$a = 3 \times 10^8$
$b = 2 \times 10^7$

Find y.
Give your answer in standard form correct to 2 significant figures.

$$y^2 = \frac{3 \times 10^8 \times 2 \times 10^7}{3 \times 10^8 + 2 \times 10^7}$$

$$= \frac{6 \times 10^{15}}{3.2 \times 10^8}$$

$$= 18750000$$

$$y = \sqrt{18750000}$$

$$= 4330.127...$$

$$= 4300 \ (2sf)$$

$$= 4.3 \times 10^3 \ (2sf)$$

$y = \underline{4.3 \times 10^3 \ (2sf)}$

(4 marks)