Edexcel GCSE
Mathematics (Linear) – 1MA0

RECURRING DECIMALS INTO FRACTIONS

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) Change $\frac{3}{11}$ to a decimal.

$$\begin{array}{r} 0.2\,7\,2\,7\,\ldots \\ 11\overline{\smash{)}3.{}^3 0 {}^8 0 {}^3 0 {}^8 0} \end{array}$$

$0.2\dot{7}$

(1)

(b) Prove that the recurring decimal $0.3\dot{9} = \frac{13}{33}$

$$x = 0.\dot{3}\dot{9}$$
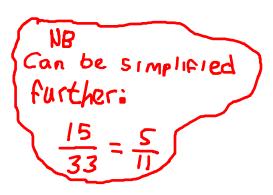$$100x = 39.\dot{3}\dot{9}$$
$$99x = 39$$
$$x = \frac{39}{99} = \frac{13}{33}$$

(3)
(Total 4 marks)

2. Prove that the recurring decimal $0.\dot{4}\dot{5} = \frac{15}{33}$

$$x = 0.\dot{4}\dot{5}$$
$$100x = 45.\dot{4}\dot{5}$$
$$99x = 45$$
$$x = \frac{45}{99} = \frac{15}{33}$$

NB
Can be simplified further:
$$\frac{15}{33} = \frac{5}{11}$$

(Total 3 marks)

3. Express the recurring decimal $0.2\dot{1}\dot{3}$ as a fraction.

$$x = 0.2\dot{1}\dot{3}$$
$$10x = 2.\dot{1}\dot{3}$$
$$1000x = 213.\dot{1}\dot{3}$$
$$990x = 211$$
$$x = \frac{211}{990}$$

$$\frac{211}{990}$$
....

(Total 3 marks)

4. Prove that $0.4\dot{7}\dot{3}$ can be written as the fraction $\frac{469}{990}$

$$x = 0.4\dot{7}\dot{3}$$
$$10x = 4.\dot{7}\dot{3}$$
$$1000x = 473.\dot{7}\dot{3}$$
$$990x = 469$$
$$x = \frac{469}{990}$$

(Total 2 marks)

5. Prove that the recurring decimal $0.\dot{1}\dot{7} = \dfrac{17}{99}$

$x = 0.\dot{1}\dot{7}$

$100x = 17.\dot{1}\dot{7}$

$99x = 17$

$x = \dfrac{17}{99}$

(Total 2 marks)

6. (a) Express $0.\dot{2}\dot{7}$ as a fraction in its simplest form.

$x = 0.\dot{2}\dot{7}$

$100x = 27.\dot{2}\dot{7}$

$99x = \dfrac{27}{99}$

$\dfrac{27}{99}$

....

(3)

x is an integer such that $1 \le x \le 9$

(b)   Prove that $0.0\dot{x} = \dfrac{x}{99}$

$F = 0.0\dot{x}$

$100\, F = x.0\dot{x}$

$99F = x$

$F = \dfrac{x}{99}$

(2)
(Total 5 marks)

7.   Change the recurring decimal $0.\dot{2}\dot{3}$ to a fraction.

$x = 0.\dot{2}\dot{3}$

$100x = 23.\dot{2}\dot{3}$

$99x = 23$

$x = \dfrac{23}{99}$

$\dfrac{23}{99}$

(Total 2 marks)

8. (i) Convert the recurring decimal $0.\dot{3}\dot{6}$ to a fraction.

$$x = 0.\dot{3}\dot{6}$$
$$100x = 36.\dot{3}\dot{6}$$
$$99x = 36$$
$$x = \frac{36}{99} = \frac{4}{11}$$

$$\frac{4}{11}$$

(ii) Convert the recurring decimal $2.1\dot{3}\dot{6}$ to a mixed number.
Give your answer in its simplest form.

$$x = 0.1\dot{3}\dot{6}$$
$$10x = 1.\dot{3}\dot{6}$$
$$1000x = 136.\dot{3}\dot{6}$$
$$990x = 135$$
$$x = \frac{135}{990} = \frac{3}{22}$$

Since $0.1\dot{3}\dot{6} = \frac{3}{22}$

then $2.1\dot{3}\dot{6} = 2\frac{3}{22}$

$$2\frac{3}{22}$$

(Total 5 marks)

9. Convert the recurring decimal $2.1\dot{4}\dot{5}$ to a fraction.

$$x = 0.1\dot{4}\dot{5}$$
$$10x = 1.\dot{4}\dot{5}$$
$$1000x = 145.\dot{4}\dot{5}$$
$$990x = 144$$
$$x = \frac{144}{990} = \frac{8}{55}$$

$$2\frac{8}{55}$$

(Total 3 marks)

10. Express the recurring decimal $0.1\dot{2}\dot{6}$ as a fraction.

$$x = 0.1\dot{2}\dot{6}$$

$$10x = 1.\dot{2}\dot{6}$$

$$1000x = 126.\dot{2}\dot{6}$$

$$990x = 125$$

$$x = \frac{125}{990} = \frac{5}{36}$$

You don't actually need to simplify for full marks

$$\frac{5}{36}$$

....

(Total 3 marks)

11. Express $0.3\dot{2}\dot{8}$ as a fraction in its simplest form.

$$x = 0.3\dot{2}\dot{8}$$

$$10x = 3.\dot{2}\dot{8}$$

$$1000x = 328.\dot{2}\dot{8}$$

$$990x = 325$$

$$x = \frac{325}{990} = \frac{65}{198}$$

You have to simplify this time for full marks.

$$\frac{65}{198}$$

....

(Total 3 marks)

12. The recurring decimal $0.\dot{7}\dot{2}$ can be written as the fraction $\frac{8}{11}$

Write the recurring decimal $0.5\dot{7}\dot{2}$ as a fraction.

$0.0\dot{7}\dot{2} = \frac{8}{110}$

$0.5 = \frac{1}{2} = \frac{55}{110}$

$0.5\dot{7}\dot{2} = \frac{8}{110} + \frac{55}{110} = \frac{63}{110}$

$$\frac{63}{110}$$

(Total 2 marks)

13. Express the recurring decimal $2.0\dot{6}$ as a fraction.
Write your answer in its simplest form.

$0.\dot{6} = \frac{2}{3}$

$0.0\dot{6} = \frac{2}{30} = \frac{1}{15}$

$\therefore \ 2.0\dot{6} = 2\frac{1}{15}$

$$2\frac{1}{1}$$

(Total 3 marks)