

# 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

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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

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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

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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.

$$11 \overline{) 3.0000} \begin{array}{l} 0.2727 \dots \end{array}$$

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

(1)

- (b) Prove that the recurring decimal  $0.\dot{3}\dot{9} = \frac{13}{33}$

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

(3)

(Total 4 marks)

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

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

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.

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

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

.....  
(Total 3 marks)

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

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

(Total 2 marks)

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

$$\begin{aligned}x &= 0.\dot{1}\dot{7} \\100x &= 17.\dot{1}\dot{7} \\99x &= 17 \\x &= \frac{17}{99}\end{aligned}$$

(Total 2 marks)

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

$$\begin{aligned}x &= 0.\dot{2}\dot{7} \\100x &= 27.\dot{2}\dot{7} \\99x &= \frac{27}{99}\end{aligned}$$

$$\frac{27}{99}$$

(3)

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

(b) Prove that  $0.\dot{0}\dot{x} = \frac{x}{99}$

$$\begin{aligned} F &= 0.\dot{0}\dot{x} \\ 100F &= x.\dot{0}\dot{x} \\ 99F &= x \\ F &= \frac{x}{99} \end{aligned}$$

(2)

(Total 5 marks)

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

$$\begin{aligned} x &= 0.\dot{2}\dot{3} \\ 100x &= 23.\dot{2}\dot{3} \\ 99x &= 23 \\ x &= \frac{23}{99} \end{aligned}$$

$$\frac{23}{99}$$

.....  
(Total 2 marks)

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

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

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

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

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

$$\begin{aligned} \text{Since } 0.1\dot{3}\dot{6} &= \frac{3}{22} \\ \text{then } 2.1\dot{3}\dot{6} &= 2\frac{3}{22} \end{aligned}$$

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

(Total 5 marks)

9. Convert the recurring decimal  $2.14\dot{5}$  to a fraction.

$$\begin{aligned} x &= 0.14\dot{5} \\ 10x &= 1.4\dot{5} \\ 1000x &= 145.\dot{5} \\ 990x &= 144 \\ x &= \frac{144}{990} = \frac{8}{55} \end{aligned}$$

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

(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.

$$0.\dot{7}\dot{2} = \frac{8}{110}$$

$$0.\dot{5} = \frac{1}{2} = \frac{55}{110}$$

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

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

(Total 2 marks)

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

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

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

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

$$2\frac{1}{15}$$

(Total 3 marks)