RECURRING DECIMALS

EXAM-TYPE QUESTIONS

NO CALCULATOR

Ref: G115. 1R1

A1 State the conditions under which a fraction can be written as a **terminating** decimal.	**A2** State the conditions under which a fraction can be written as a **recurring** decimal.	**A3** Which of the following can be written as **terminating** decimals: $\frac{2}{3}$ $\frac{3}{4}$ $\frac{4}{9}$ $\frac{5}{6}$ $\frac{5}{8}$ $\frac{3}{7}$ $\frac{3}{5}$	**A4** Which of the following can be written as **recurring** decimals: $\frac{5}{12}$ $\frac{7}{25}$ $\frac{3}{14}$ $\frac{5}{16}$ $\frac{5}{32}$ $\frac{5}{11}$
B1 Show that $0.\dot{5}=\frac{5}{9}$	**B2** Show that $0.7\dot{3}=\frac{11}{15}$	**B3** Show that $0.61\dot{6}=\frac{37}{60}$	**B4** Show that $3.5\dot{2}=3\frac{47}{90}$
C1 Show that $0.\dot{2}\dot{7}=\frac{3}{11}$	**C2** Show that $0.2\dot{5}\dot{7}=\frac{17}{66}$	**C3** Show that $0.\dot{4}4\dot{7}=\frac{149}{333}$	**C4** Show that $2.\dot{5}\dot{1}=2\frac{17}{33}$
D1 Work out $0.2\dot{7}\times 3$, writing your answer as a fraction in its simplest terms.	**D2** Work out $0.5\dot{7}-0.2\dot{6}$, writing your answer as a fraction in its simplest terms.	**D3** x is a whole number such that $1\le x\le 9$ Write the recurring decimal $0.1\dot{x}$ as a fraction in its simplest terms.	.

REVIEW

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RECURRING DECIMALS

EXAM-TYPE QUESTIONS

NOTE: Only one method of solution to each question is shown on this sheet, but other methods are also acceptable – check with your teacher

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A1

If the prime factorisation of the denominator contains powers of 2 and 5 only, then the decimal expansion will be terminating.

A2

If the prime factorisation of the denominator contains any number other than a power of 2 or 5, then the decimal expansion will be recurring.

A3

Which of the following can be written as **terminating** decimals:

$\frac{2}{3}$ $\frac{3}{4}$ $\frac{4}{9}$ $\frac{5}{6}$ $\frac{5}{8}$ $\frac{3}{7}$ $\frac{3}{5}$

A4

Which of the following can be written as **recurring** decimals:

$\frac{5}{12}$ $\frac{7}{25}$ $\frac{3}{14}$ $\frac{5}{16}$ $\frac{5}{32}$ $\frac{5}{11}$

B1

$x = 0.555555\ldots$
$10x = 5.555555\ldots$ } subtract
$9x = 5$
$x = \frac{5}{9}$

B2

$x = 0.733333\ldots$
$10x = 7.333333\ldots$ } subtract
$9x = 6.6$
$x = \frac{6.6}{9} = \frac{66}{90} = \frac{11}{15}$

B3

$x = 0.6166666\ldots$
$10x = 6.1666666\ldots$ } subtract
$9x = 5.55$
$x = \frac{5.55}{9} = \frac{555}{900} = \frac{37}{60}$

B4

$x = 3.522222\ldots$
$10x = 35.222222\ldots$ } subtract
$9x = 31.7$
$x = \frac{31.7}{9} = \frac{317}{90} = 3\frac{47}{90}$

C1

$x = 0.272727\ldots$
$100x = 27.272727\ldots$ } subtract
$99x = 27$
$x = \frac{27}{99} = \frac{3}{11}$

C2

$x = 0.257575\ldots$
$100x = 25.757575\ldots$ } subtract
$99x = 25.5$
$x = \frac{25.5}{99} = \frac{255}{990} = \frac{17}{66}$

C3

$x = 0.4474474\ldots$
$1000x = 447.4474474\ldots$ } subtract
$999x = 447$
$x = \frac{447}{999} = \frac{149}{333}$

C4

$x = 2.515151\ldots$
$100x = 251.515151\ldots$ } subtract
$99x = 249$
$x = \frac{249}{99} = \frac{83}{33} = 2\frac{17}{33}$

D1

$x = 0.277777\ldots$
$10x = 2.777777\ldots$ } subtract
$9x = 2.5$
$x = \frac{2.5}{9} = \frac{5}{18} \Rightarrow \frac{5}{18} \times 3 = \frac{5}{6}$

D2

$0.577777\ldots$
$-\ 0.262626\ldots$ } subtract
$0.31515151\ldots$

now convert to a fraction → $\frac{312}{990} = \frac{52}{165}$

D3

$0.\dot{x} = \frac{x}{9} \Rightarrow 0.0\dot{x} = \frac{x}{90}$

$\Rightarrow 0.1\dot{x} = 0.1 + 0.0\dot{x}$

$= \frac{1}{10} + \frac{x}{90} = \frac{9+x}{90}$