QT Recurring Decimals to Fractions

1. Convert $\frac{5}{11}$ to a decimal (2 marks)

$$11\overline{)5.0000} = 0.4545\ldots$$

$$0.\dot{4}\dot{5}$$

2. Prove algebraically that the recurring decimal $0.\dot{8}$ can be written as $\frac{8}{9}$

(2 marks)

$x = 0.8888\ldots$

$$10x = 8.8888\ldots$$
$$x = 0.8888\ldots$$
$$9x = 8$$
$$x = \frac{8}{9}$$

3. Prove algebraically that the recurring decimal $0.\dot{2}\dot{7}$ can be written as $\frac{3}{11}$

(2 marks)

$x = 0.272727\ldots$

$$100x = 27.2727\ldots$$
$$x = 0.2727\ldots$$
$$99x = 27$$
$$x = \frac{27}{99} = \frac{3}{11}$$

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4. $\frac{1}{5}$ as a decimal is 0.2. Find the fraction which is equivalent to $0.\dot{2}$

(2 marks)

$x = 0.2222...$

$10x = 2.2222...$

$x = 0.2222...$

$9x = 2$

$x = \frac{2}{9}$

5. Prove algebraically that the recurring decimal $0.68\dot{1}\dot{8}$ can be written as $\frac{15}{22}$

(3 marks)

$x = 0.6818181...$

$3\overline{)675}\ 225$

$100x = 68.181818...$

$x = 0.681818...$

$99x = 67.5$

$x = \frac{67.5}{99} = \frac{675}{990} = \frac{135}{330}$

$= \frac{45}{66} = \frac{15}{22}$

6. Convert $0.1\dot{6}$ to a fraction. Give your answer in its simplest form.

(3 marks)

$x = 0.16666...$

$100x = 16.666...$

$x = 0.1666...$

$99x = 16.5$

$x = \frac{16.5}{99} = \frac{165}{990} = \frac{55}{330}$

$= \frac{11}{66} = \frac{1}{6}$

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7. Convert $0.\dot{3}\dot{4}$ to a fraction. Give your answer in its simplest form.

(3 marks)

$x = 0.343434\ldots$

$100x = 34.343434\ldots$

$x = 0.343434\ldots$

$99x = 34$

$x = \frac{34}{99}$

8. Prove algebraically that the recurring decimal $0.2\dot{1}\dot{6}$ can be written as $\frac{8}{37}$

(3 marks)

$x = 0.216216\ldots$

$1000x = 216.216216$

$x = 0.216216$

$999x = 216$

$x = \frac{216}{999} = \frac{24}{111} = \frac{8}{37}$

9.Write $2.\dot{1}6\dot{5}$ as a mixed number. Give your answer in its simplest form.

(3 marks)

$x = 2.165165\ldots$

$1000x = 2165.165165\ldots$

$x = 2.165165\ldots$

$999x = 2163$

$x = \frac{2163}{999} = 2\frac{163}{999}$

$= 2\frac{55}{333}$

$999 \times 2 = 1998$

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10. Work out $0.\dot{4}\dot{5}$ x $0.\dot{5}$ (4 marks)

$x = 0.4545...$

$100x = 45.4545...$

$x = 0.4545...$

$99x = 45$

$x = \frac{45}{99} = \frac{5}{11}$

$x = 0.555...$

$10x = 5.5555...$

$x = 0.5555...$

$9x = 5$

$x = \frac{5}{9}$

$\frac{5}{11} \times \frac{5}{9} = \frac{25}{99}$

11. Work out $0.07 \div 0.\dot{2}\dot{7}$ (4 marks)

$x = 0.0777...$

$100x = 7.777...$

$x = 0.077...$

$99x = 7.7$

$x = \frac{7.7}{99} \cdot \frac{77}{990} = \frac{7}{90}$

$x = 0.2777...$

$100x = 27.777...$

$x = 0.277...$

$99x = 27.5$

$x = \frac{27.5}{99} \cdot \frac{275}{990} = \frac{5}{18}$

$\frac{7}{90} \div \frac{5}{18}$

$\frac{7}{\cancel{90}_{5}} \times \frac{\cancel{18}^{2}}{5} = \frac{14}{50} = \frac{7}{25}$ ANS.