Questions

Q1.

Prove algebraically that the recurring decimal $0.1\dot{7}\dot{8}$ can be written as the fraction $\frac{59}{330}$

$x = 0.1\dot{7}\dot{8}$

$\times 10 \qquad \times 10$

$10x = 1.\dot{7}\dot{8}$

$\times 100 \qquad \times 100$

$1000x = 178.\dot{7}\dot{8}$

$1000x - 10x = 178.\dot{7}\dot{8} - 1.\dot{7}\dot{8}$

$990x = 177$

$x = \frac{177}{990}$

$x = \frac{177 \div 3}{990 \div 3}$

$x = \frac{59}{330}$

(Total for question = 3 marks)

Q2.

Prove algebraically that the recurring decimal $0.2\dot{5}$. has the value $\frac{23}{90}$

$x = 0.2\dot{5}$

$\times 10 \qquad \times 10$

$10x = 2.\dot{5}$

$\times 10 \qquad \times 10$

$100x = 25.\dot{5}$

$100x - 10x = 25.\dot{5} - 2.\dot{5}$

$90x = 23$

$\therefore x = \frac{23}{90}$

(Total for question = 2 marks)

Q3.

Prove algebraically that the recurring decimal $0.3\dot{1}\dot{8}$ can be written as $\frac{7}{22}$

$x = 0.3\dot{1}\dot{8}$

$\times 10 \qquad \times 10$

$10x = 3.\dot{1}\dot{8}$

$\times 100 \qquad \times 100$

$1000x = 318.\dot{1}\dot{8}$

$1000x - 10x = 318.\dot{1}\dot{8} - 3.\dot{1}\dot{8}$

$990x = 315$

$x = \frac{315}{990}$

$x = \frac{315}{990} \div 5$

$x = \frac{63}{198} \div 3$

$x = \frac{21}{66} \div 3$

$x = \frac{7}{22}$

(Total for question = 2 marks)

Q4.

Express the recurring decimal $0.28\dot{1}$ as a fraction in its simplest form.

$x = 0.28\dot{1}$

$\times 10$ $\times 10$

$10x = 2.8\dot{1}$

$\times 100$ $\times 100$

$1000x = 281.8\dot{1}$

$1000x - 10x = 281.8\dot{1} - 2.8\dot{1}$

$990x = 279$

$x = \frac{279 \div 3}{990 \div 3}$

$x = \frac{93 \div 3}{330 \div 3}$

$x = \frac{31}{110}$

.....

(Total for Question is 3 marks)

Q5.

Prove that the recurring decimal $0.4\dot{3}$ has the value $\frac{13}{30}$

$x = 0.4\dot{3}$

$\times 10$ $\times 10$

$10x = 4.\dot{3}$

$\times 10$ $\times 10$

$100x = 43.\dot{3}$

$100x - 10x = 43.\dot{3} - 4.\dot{3}$

$90x = 39.0$

$90x = 39$

$x = \frac{39 \div 3}{90 \div 3}$

$x = \frac{13}{30}$

(Total for question = 2 marks)

Q6.

Write $0.62\dot{4}$ as a fraction in its simplest form.

$x = 0.62\dot{4}$

$\times 10$ $\times 10$

$10x = 6.2\dot{4}$

$\times 100$ $\times 100$

$1000x = 624.2\dot{4}$

$1000x - 10x = 624.2\dot{4} - 6.2\dot{4}$

$990x = 618.00$

$990x = 618$

$x = \frac{618 \div 2}{990 \div 2}$

$x = \frac{309 \div 3}{495 \div 3}$

$x = \frac{103}{165}$

.....

(Total for question = 3 marks)

Q7.

$x = 0.43\dot{6}$

Prove algebraically that x can be written as $\frac{24}{55}$

$x = 0.43\dot{6}$

$\times 10$ $\times 10$

$10x = 4.3\dot{6}$

$\times 100$ $\times 100$

$1000x = 436.3\dot{6}$

$1000x - 10x = 436.3\dot{6} - 4.3\dot{6}$

$990x = 432$

$x = \frac{432 \div 2}{990 \div 2}$

$x = \frac{216}{495}$

$x = \frac{216 \div 3}{495 \div 3}$

$x = \frac{72}{165} \div 3$

$x = \frac{24}{55}$

(Total for question = 3 marks)

Q8.

Using algebra, prove that $0.1\dot{3}\dot{6} \times 0.\dot{2}$ is equal in value to $\frac{1}{33}$

$x = 0.1\dot{3}\dot{6}$

$\times 10 \qquad \times 10$

$10x = 1.\dot{3}\dot{6}$

$\times 100 \qquad \times 100$

$1000x = 136.\dot{3}\dot{6}$

$1000x - 10x = 136.\dot{3}\dot{6} - 1.\dot{3}\dot{6}$

$990x = 135$

$x = \frac{135}{990}$

$x = 0.\dot{2}$

$\times 10 \qquad \times 10$

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

$10x - x = 2.\dot{2} - 0.\dot{2}$

$9x = 2$

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

(Total for question = 3 marks)

$\frac{135 \div 5}{990 \div 5} \times \frac{2}{9}$

$\frac{27 \div 3}{198 \div 3} \times \frac{2}{9}$

$\frac{9}{66} \times \frac{2}{9} = \frac{9 \times 2}{66 \times 9} = \frac{2}{66} = \frac{1}{33}$

Q9.

Express the recurring decimal $0.7\dot{5}\dot{0}$ as a fraction.

$x = 0.7\dot{5}\dot{0}$

$\times 10 \qquad \times 10$

$10x = 7.\dot{5}\dot{0}$

$\times 100 \qquad \times 100$

$1000x = 750.\dot{5}\dot{0}$

$1000x - 10x = 750.\dot{5}\dot{0} - 7.\dot{5}\dot{0}$

$990x = 743.00$

$x = \frac{743}{990}$

$x = \frac{743}{990}$

(Total for Question is 3 marks)

Q10.

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

$0.\dot{2}4\dot{6} \longrightarrow 0.246464646\ldots$

$0.24\dot{6} \longrightarrow 0.246666666\ldots$

$0.\dot{2}4\dot{6} \longrightarrow 0.246246246\ldots$

$0.246 \longrightarrow 0.246000000\ldots$

$0.24\dot{6} \quad 0.\dot{2}4\dot{6} \quad 0.246 \quad 0.\dot{2}4\dot{6}$

$0.246, \quad 0.24\dot{6}, \quad 0.\dot{2}4\dot{6}, \quad 0.\dot{2}4\dot{6}$