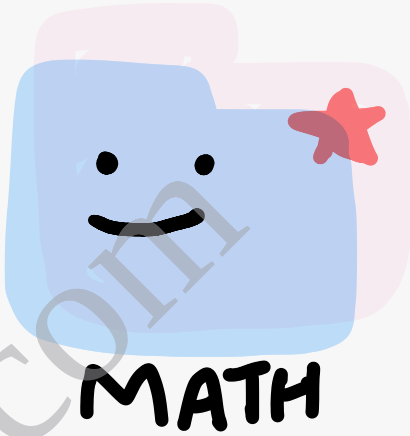
Real Numbers
Ex. 1.4



$+ \quad \times$

$- \quad \div$

Ex. 1.4

1 (i) $\frac{13}{3125}$

$3125 = 5^5$

or $3125 = 2^0 \times 5^5$

Since factors of q i.e. 3125 are of the form $2^n \times 5^m$

$\therefore \frac{13}{3125}$ will have a terminating decimal.

(ii) $\frac{17}{8}$

$8 = 2^3$

or $8 = 2^3 \times 5^0$

Since factors of q i.e. 8 are of the form $2^n \times 5^m$

$\therefore \frac{17}{8}$ will have terminating decimal.

(iii) $\frac{64}{455}$

$455 = 5 \times 7 \times 13$

Since the factors of q i.e. 455 are not of the form $2^n \times 5^m$

$\therefore \frac{64}{455}$ will have a non-terminating repeating decimal.

(iv) $\frac{15}{1600} = \frac{3}{320}$

$320 = 2^6 \times 5$

Since the factors of q i.e. 320 are of

the form $2^n \times 5^m$.

$\therefore \frac{15}{1600}$ will have a terminating decimal.

(v) $\frac{29}{343}$

$343 = 7^3$

Since the factors of q are not of the form $2^n \times 5^m$

$\therefore \frac{29}{343}$ will have a non-terminating repeating decimal.

(vi) $\frac{23}{2^3 5^2}$

Since the factors of q, are of the form $2^n \times 5^m$.

$\therefore \frac{23}{2^3 5^2}$ will have a terminating decimal.

(vii) $\frac{129}{2^2 5^7 7^5}$

Since the factors of q are not of the form $2^n \times 5^m$

$\therefore \frac{129}{2^2 5^7 7^5}$ will have a non-terminating repeating decimal.

(viii) $\frac{\cancel{6}\,2}{\cancel{15}\,5} = \frac{2}{5\times 2^0}$

Since the factors of q are of the form $2^n \times 5^m$.

$\therefore$ $\frac{6}{15}$ will have a terminating decimal.

(ix) $\frac{\cancel{35}\,7}{\cancel{50}\,10} = \frac{7}{10} = \frac{7}{2\times 5}$

Since the factors of q are of the form $2^n \times 5^m$

$\therefore$ $\frac{35}{50}$ will have a terminating decimal.

(x) $\frac{\cancel{77}\,11}{\cancel{210}\,30} = \frac{11}{30} = \frac{11}{2\times 3\times 5}$

Since the factors of q are not of the form $2^n \times 5^m$.

$\therefore$ $\frac{77}{210}$ will have a non-terminating repeating decimal.

2 (i) $\frac{13}{3125} = \frac{13}{5^5} \times \frac{2^5}{2^5} = \frac{416}{10^5} = 0.00416$

(ii) $\frac{17}{8} = \frac{17}{2^3} \times \frac{5^3}{5^3} = \frac{17\times 125}{10^3} = \frac{2125}{10^3} = 2.125$

(iv) $\frac{\cancel{15}\,3}{\cancel{1600}\,320} = \frac{3}{320} = \frac{3}{2^6\times 5} \times \frac{5^5}{5^5} = \frac{3\times 3125}{10^6} = \frac{9375}{10^6} = 0.009375$

(vi) $\frac{23}{2^3 5^2} \times \frac{5}{5} = \frac{115}{10^3} = 0.115$

(viii) $\frac{\cancel{6}\,2}{\cancel{15}\,5} = \frac{2}{5} \times \frac{2}{2} = \frac{4}{10} = 0.4$

(ix) $\frac{\cancel{35}\,7}{\cancel{50}\,10} = \frac{7}{10} = 0.7$

30 (i) 43.123456789 is a rational number as it is a terminating decimal. The prime factors of q are of the form $2^n \times 5^m$.

(ii) 0.120120012000120000---- is an irrational number as it is a non-terminating non-repeating decimal.

(iii) $43.\overline{123456789}$ is a rational number as it is a non-terminating repeating decimal. The prime factors of q are not of the form $2^n \times 5^m$.