

Real Numbers

1. Prime Factors

Every natural number can be written as a product of its prime factors.

e.g. $324 = 4 \times 81$
 $\quad = \underline{2^2 \times 3^4}$

2. Highest Common Factor (HCF)

1) Write both numbers in terms of its prime factors

2) Take out the common factors

e.g. 1176 and 252

$$\begin{aligned} 1176 &= 6 \times 196 \\ &= 3 \times 2 \times 49 \times 4 \\ &= 3 \times 2^3 \times 7^2 \end{aligned}$$

$$\begin{aligned} 252 &= 4 \times 63 \\ &= 4 \times 9 \times 7 \\ &= 2^2 \times 3^2 \times 7 \end{aligned}$$

$$\begin{aligned} \text{HCF} &= 2^2 \times 3 \times 7 \\ &= \underline{84} \end{aligned}$$

*When factorising, remove
the lowest power*

3. Lowest Common Multiple (LCM)

- 1) Write both numbers in terms of its prime factors
- 2) Write down all factors without repeating

e.g. 48 and 15

$$\begin{aligned}48 &= 16 \times 3 \\ &= 2^4 \times 3\end{aligned}$$

$$15 = 3 \times 5$$

$$\begin{aligned}LCM &= 2^4 \times 3 \times 5 \\ &= \underline{240}\end{aligned}$$

*When creating a LCM,
use the highest power*

4. Divisibility Tests

2: even number

8: last three digits are divisible by 8

3: digits add to a multiple of 3

9: sum of the digits is divisible by 9

4: last two digits are divisible by 4

10: ends in a 0

5: ends in a 5 or 0

11: sum of even positioned digits =
sum of odd positioned digits, or
differ by a multiple of 11.

6: divisible by 2 and 3

7: double the last digit and subtract from
the other digits, answer is divisible by 7

Fractions & Decimals

Converting Recurring Decimals into Fractions

e.g. (i) $0.\dot{6} = 0.666666\dots$

let $x = 0.\dot{6}$

$$x = 0.666666\dots \quad \text{—}$$

$$10x = 6.666666\dots$$

$$9x = 6$$

$$x = \frac{6}{9} \quad \therefore 0.\dot{6} = \frac{2}{3}$$

(ii) $0.\dot{8}\dot{1} = 0.818181\dots$

let $x = 0.\dot{8}\dot{1}$

$$x = 0.818181\dots \quad \text{—}$$

$$100x = 81.818181\dots$$

$$99x = 81$$

$$x = \frac{81}{99} \quad \therefore 0.\dot{8}\dot{1} = \frac{9}{11}$$

(iii) $0.3\dot{2}\dot{7} = 0.3272727\dots$

let $x = 0.3\dot{2}\dot{7}$

$$x = 0.3272727\dots \quad \text{—}$$

$$100x = 32.7272727\dots$$

$$99x = 32.4$$

$$x = \frac{32.4}{99} = \frac{324}{990} \quad \therefore 0.3\dot{2}\dot{7} = \frac{18}{55}$$

Alternatively:

e.g.(i) $0.\dot{6} = \frac{6}{9}$ ← 6 is recurring
 $= \frac{2}{3}$ ← 1 number recurring, use '9'

(iii) $0.\dot{7}13\dot{4} = \frac{7134}{9999}$
 $= \frac{2378}{3333}$

(ii) $0.8\dot{1} = \frac{81}{99}$ ← 81 is recurring
 $= \frac{9}{11}$ ← 2 numbers recurring, use '99'

(iv) $0.3\dot{2}\dot{7} = \frac{324}{990}$ ← 327 - 3 (subtract number not recurring)
 $= \frac{18}{55}$ ← 2 numbers recurring, 1 not use '990'

(v) $0.10\dot{9}\dot{6} = \frac{1086}{9900}$ ← 1096 - 10
 $= \frac{181}{1650}$ ← 2 numbers recurring, 2 not use '9900'

Exercise 2A;
 2adgj, 3bd, 4ac,
 5acegi, 6, 7cdg,
 8bdfhj, 9, 10bd,
 11ac, 12, 13*,
 14*