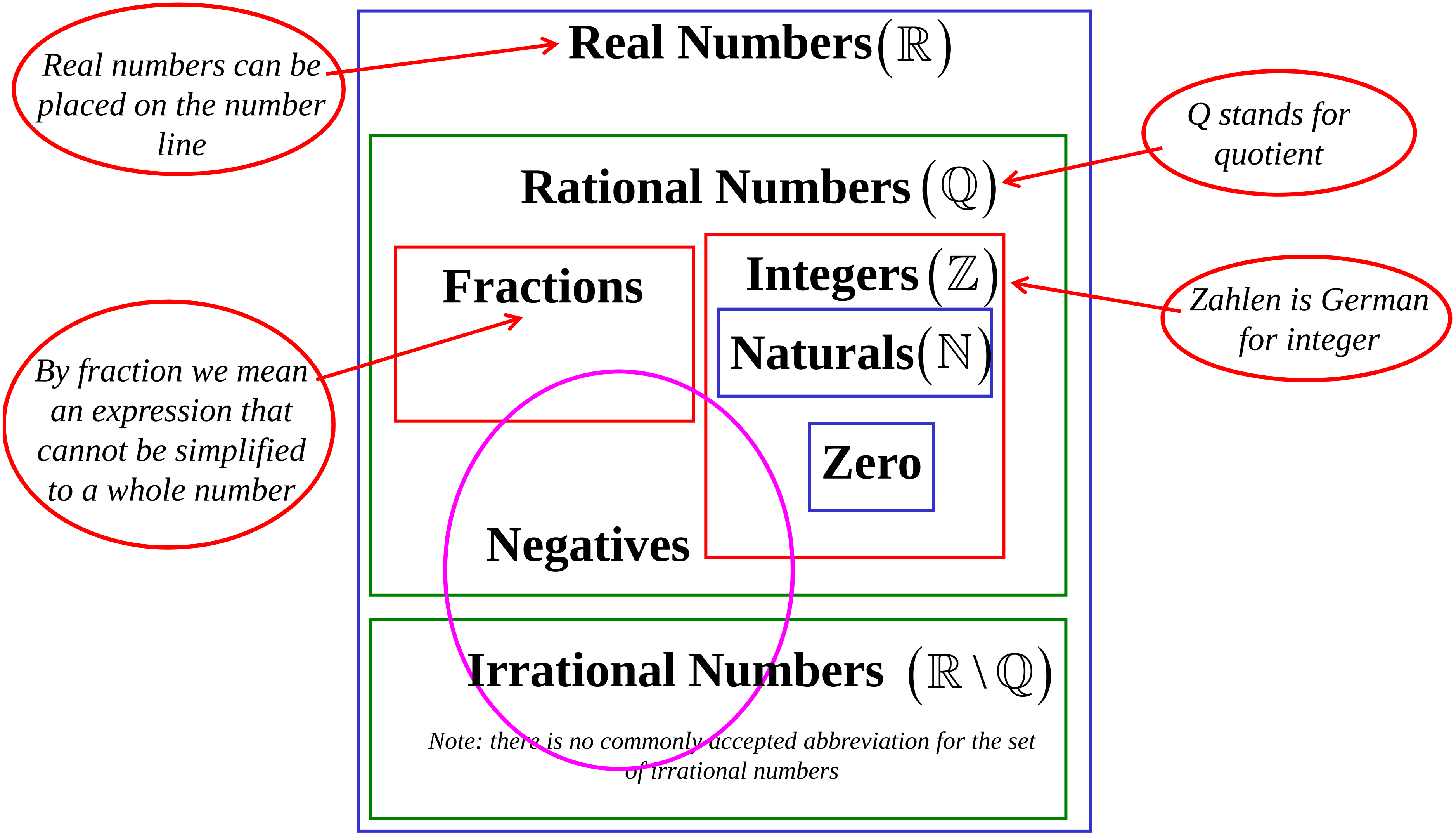
Real Numbers



1. Prime Factors

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

e.g. $324 = 4 \times 81$

$= 2^2 \times 3^4$

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

$1176 = 6 \times 196$

$= 3 \times 2 \times 49 \times 4$

$= 3 \times 2^3 \times 7^2$

$252 = 4 \times 63$

$= 4 \times 9 \times 7$

$= 2^2 \times 3^2 \times 7$

$HCF = 2^2 \times 3 \times 7$

$= 84$

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

$$48 = 16 \times 3$$
$$= 2^4 \times 3$$

$$15 = 3 \times 5$$

When creating a LCM, use the highest power

$$LCM = 2^4 \times 3 \times 5$$
$$= 240$$

4. Divisibility Tests

2: even number

3: digits add to a multiple of 3

4: last two digits are divisible by 4

5: ends in a 5 or 0

6: divisible by 2 and 3

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

8: last three digits are divisible by 8

9: sum of the digits is divisible by 9

10: ends in a 0

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

Fractions & Decimals

Converting Recurring Decimals into Fractions

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

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

$$x = 0.666666\ldots \quad -$$

$$10x = 6.666666\ldots$$

$$9x = 6$$

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

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

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

$$x = 0.818181\ldots \quad -$$

$$100x = 81.818181\ldots$$

$$99x = 81$$

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

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

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

$$x = 0.3272727\ldots \quad -$$

$$100x = 32.7272727\ldots$$

$$99x = 32.4$$

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

Alternatively:

e.g.(*i*) $0.\dot{6} = \frac{6}{9} = \frac{2}{3}$

6 is recurring

1 number recurring, use '9'

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

(*ii*) $0.\dot{8}\dot{1} = \frac{81}{99} = \frac{9}{11}$

81 is recurring

2 numbers recurring, use '99'

(*iv*) $0.3\dot{2}\dot{7} = \frac{324}{990} = \frac{18}{55}$

327 – 3 (subtract number not recurring)

2 numbers recurring, 1 not use '990'

(*v*) $0.10\dot{9}\dot{6} = \frac{1086}{9900} = \frac{181}{1650}$

1096 – 10

2 numbers recurring, 2 not use '9900'

Exercise 2A;
1d, 2d, 3c, 4c, 5gj, 6fh, 7dh, 8cfg, 10j, 11adgj,13ceh, 14b, 16, 18abc

Old Cambridge Exercise 2A; 6, 8bdhj, 10bd, 11ac