

# Year 9

## INTEGERS, ROUNDING AND PLACE VALUE

### Key Concepts

Digits are the individual components of a number.

Integers are whole numbers.

Rounding rules:

A value of 5 to 9 rounds the number up.

A value of 0 to 4 keeps the number the same.

### Examples

**Order** the following numbers starting with the smallest:

1) 5, -3, 4, 7, -2  
-3, -2, 4, 5, 7

2) 0.067 0.6 0.56 0.65 0.605  
Rewrite 0.067, 0.600, 0.560, 0.650, 0.605  
0.067 0.56 0.6 0.605 0.65

**Round** 3.527 to:

a) 1 decimal place

$$3.5\overset{\cdot}{2}7 \rightarrow 3.5$$

b) 2 decimal places

$$3.5\overset{\cdot}{2}\overset{\cdot}{7} \rightarrow 3.53$$

c) 1 significant figure

$$3.\overset{\cdot}{5}27 \rightarrow 4$$

 hegartymaths

1 – 3, 31 – 32

### Key Words

Integer Even

Digit

Odd

Decimal place

Significant figures

A) Order the following numbers starting with the smallest:

1) 6, -2, 0, -5, 3      2) 0.72, 0.7, 0.072, 0.07, 0.702

B) Round the following numbers to the given degree of accuracy

1) 14.1732 (1 d.p.)    2) 0.0568 (2 d.p.)    3) 3418 (1 S.F)

# Year 9 DECIMALS

## Key concepts

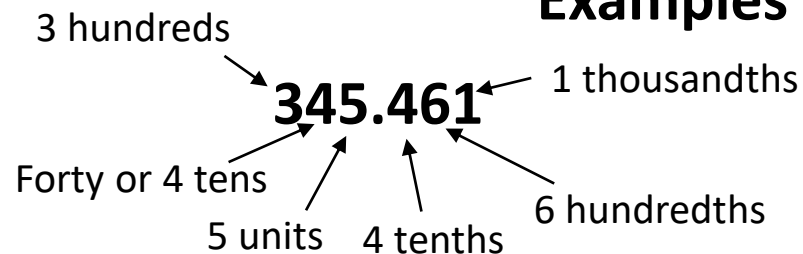
Place value:

Th H T U. t h th

When adding and subtracting decimals we must ensure the decimal places are underneath each other when setting up.

When multiplying decimals, calculate without the decimal point and use estimation to help replace it.

## Examples



$$42.8 + 5.32$$

$$\begin{array}{r} 42.80 \\ + 5.32 \\ \hline 48.12 \end{array}$$

$$42.8 - 5.32$$

$$\begin{array}{r} 31.71 \\ 42.80 \\ - 5.32 \\ \hline 37.48 \end{array}$$

$$42.8 \times 5.3$$

	4	2	8	
2	2	0	1	0
2	1	2	0	6
	6	8	4	

$$226.84$$

Estimated answer  $40 \times 5 = 200$

 hegartymaths

102 - 110

## Key Words

Decimal  
Tenths  
Hundredths  
Thousandths

A) What is the value of the 4 in each number?

1) 498   2) 8746   3) 6.243   4) 1.004

B) Work out:

1)  $3.1 + 5.27$    2)  $16.4 - 9.18$    3)  $0.03 \times 500$    4)  $3.4 \times 5.6$

5)  $4.79 \times 6.8$

ANSWERS: A 1) 4 hundred 2) forty 3) 4 hundredths 4) 4 thousandths  
 B 1) 8.37 2) 7.22 3) 15 4) 19.04 5) 32.572

# Year 9

## INDICES AND ROOTS

### Key Concepts

$$a^m \times a^n = a^{m+n}$$

$$a^m \div a^n = a^{m-n}$$

$$(a^m)^n = a^{mn}$$

$$a^{\frac{1}{n}} = \sqrt[n]{a}$$

$$a^{-m} = \frac{1}{a^m}$$

### Examples

Simplify each of the following:

$$1) a^6 \times a^4 = a^{6+4} \\ = a^{10}$$

$$2) a^6 \div a^4 = a^{6-4} \\ = a^2$$

$$3) (a^6)^4 = a^{6 \times 4} \\ = a^{24}$$

$$4) (3a^4)^3 = 3^3 a^{4 \times 3} \\ = 27a^{12}$$

$$5) \frac{5^2 \times 5^6}{5^4} = \frac{5^8}{5^4} \\ = 5^{8-4}$$

$$= 5^4$$

$$6) a^{\frac{1}{2}} = \sqrt{a}$$

$$7) 9^{\frac{1}{2}} = \sqrt{9} \\ = 3 \text{ or } -3$$

$$8) 2^{-3} = \frac{1}{2^3} = \frac{1}{8}$$

 hegartymaths

102 – 110

### Key Words

Powers  
Roots  
Indices  
Reciprocal

Simplify:

$$1) a^3 \times a^2 \quad 2) b^4 \times b \quad 3) d^{-5} \times d^{-1} \quad 4) m^6 \div m^2 \quad 5) n^4 \div n^4$$

$$6) \frac{8^4 \times 8^5}{8^6} \quad 7) \frac{4^9 \times 4}{4^3} \quad 8) (3^2)^5 \quad 9) 81^{\frac{1}{2}} \quad 10) 5^{-2}$$

# Year 9

## FACTORS, MULTIPLES AND PRIMES

### Key Concepts

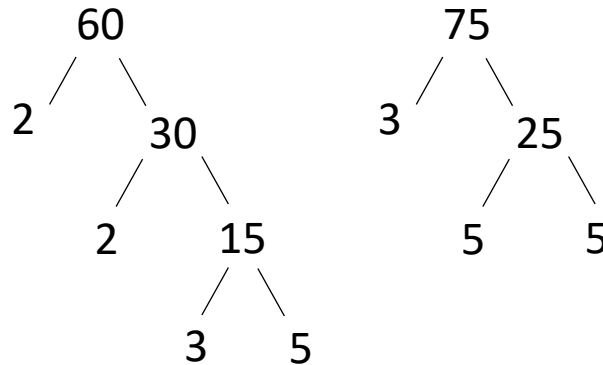
**Prime factor decomposition**  
Breaking down a number into its prime factors

**Highest common factor**  
Finding the largest number which divides into all numbers given

**Lowest common multiple**  
Finding the smallest number which both numbers divide into

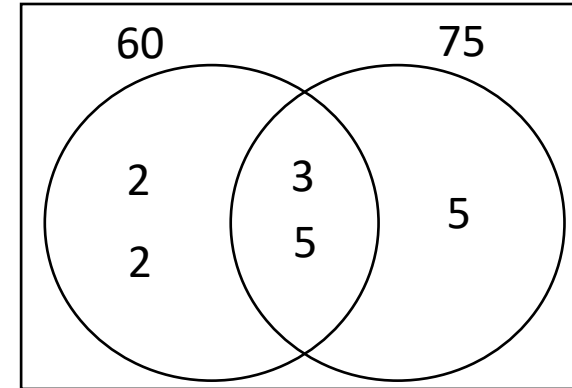
### Examples

Find the **highest common factor** and **lowest common multiple** of 60 and 75:



$$2 \times 2 \times 3 \times 5$$
$$2^2 \times 3 \times 5$$

$$3 \times 5 \times 5$$
$$3 \times 5^2$$



*HCF* – Multiply all numbers in the intersection  
 $= 3 \times 5 = 15$

*LCM* – Multiply all numbers in the Venn diagram  
 $= 2 \times 2 \times 3 \times 5 \times 5 = 300$

 hegarty**maths**

**29 – 32,34,35**

### Key Words

Factor  
Multiple  
Prime  
Highest Common Factor  
Lowest Common  
Multiple

### Questions

- 1) Write 80 as a product of its prime factors
- 2) Write 48 as a product of its prime factors
- 3) Find the LCM and HCF of 80 and 48