



# Year 6 Knowledge Mat



## Calculations with Mixed Numbers

### Add Mixed Numbers

$$8\frac{1}{2} + 3\frac{3}{4}$$

$$= \frac{17}{2} + \frac{15}{4}$$

Change to improper fractions

$$= \frac{17 \times 2}{2 \times 2} + \frac{15}{4}$$

Change to common denominator

$$= \frac{34}{4} + \frac{15}{4}$$

Add the numerators

$$= \frac{49}{4}$$

Change to mixed numbers

$$= 12\frac{1}{4}$$

### Subtract Mixed Numbers

$$8\frac{1}{2} - 4\frac{3}{4}$$

$$= \frac{17}{2} - \frac{15}{4}$$

Change to improper fractions

$$= \frac{17 \times 2}{2 \times 2} - \frac{15}{4}$$

Change to common denominator

$$= \frac{34}{4} - \frac{15}{4}$$

Subtract the numerators

$$= \frac{19}{4}$$

Change to mixed numbers

$$= 4\frac{3}{4}$$

## Dividing Fractions by Whole Numbers

$$\frac{3}{7} \div 2$$

$$\frac{3}{7} \div \frac{2}{1} \rightarrow \frac{3}{7} \times \frac{1}{2}$$

Keep      Change      Flip

$$\frac{3}{7} \times \frac{1}{2} = \frac{3 \times 1}{7 \times 2} = \frac{3}{14}$$

## Multiplying a Fraction by a Fraction

$$\frac{3}{5} \times \frac{6}{8} = \frac{3 \times 6}{5 \times 8} = \frac{18}{40}$$

$$\frac{3}{4} \times \frac{1}{3} = \frac{3 \times 1}{4 \times 3} = \frac{3}{12} = \text{reduces to } \frac{1}{4}$$

### Adding Fractions

$$\frac{1}{2} + \frac{1}{3} = ?$$

$$\frac{1 \times 3}{2 \times 3} = \frac{3}{6}$$

$$\frac{1 \times 2}{3 \times 2} = \frac{2}{6}$$

$$\frac{3}{6} + \frac{2}{6} = \frac{5}{6}$$

## Formal Methods of Multiplication and Division

134 x 27 becomes

$$\begin{array}{r} 134 \\ \times 27 \\ \hline 938 \\ 2680 \\ \hline 3618 \end{array}$$

564 ÷ 15 becomes

$$\begin{array}{r} 15 \overline{) 564} \\ \underline{45} \phantom{0} \\ 114 \\ \underline{105} \\ 9 \phantom{0} \\ \underline{9} \\ 0 \end{array}$$

$\frac{9}{15} = \frac{3}{5}$

Answer:  $37\frac{3}{5}$

432 ÷ 15 becomes

$$\begin{array}{r} 28.8 \\ 15 \overline{) 432.0} \\ \underline{30} \phantom{0} \\ 132 \\ \underline{120} \\ 120 \\ \underline{120} \\ 0 \end{array}$$

Answer: 28.8

384 ÷ 11 becomes

$$\begin{array}{r} 34 \text{ r}10 \\ 11 \overline{) 384} \\ \underline{33} \phantom{0} \\ 54 \\ \underline{55} \\ 0 \end{array}$$

Answer:  $34\frac{10}{11}$

## BODMAS

- B → Bracket
- O → Of
- D → Division
- M → Multiplication
- A → Addition
- S → Subtraction

### BODMAS EXAMPLE

$$40 - (5 \times 2^2 + 7)$$

Brackets 1<sup>st</sup> then use ODMAS inside the brackets

$$40 - (5 \times 4 + 7) \quad (2^2)$$

$$40 - (20 + 7) \quad (\text{Multiply } 5 \times 4)$$

$$40 - 27 \quad (\text{Add } 20 + 7)$$

Answer = 13

## Percentages

### On a calculator

36% of 76  $\rightarrow$  Change to a decimal and multiply  
 $0.36 \times 76$

### Increasing

Increase £70 by 14%  
14% of 70 =  $0.14 \times 70 = \text{£}9.80$   
New amount =  $\text{£}70 + \text{£}9.80 = \text{£}79.80$

### Fraction to %

$$\frac{15}{20} = \frac{75}{100} = 75\%$$

Or  $15 \div 20 \times 100 = 75\%$

### Decreasing

Decrease £70 by 14%  
14% of 70 =  $0.14 \times 70 = \text{£}9.80$   
New amount =  $\text{£}70 - \text{£}9.80 = \text{£}60.20$

### Without a calculator

50% - half	10% - divide by 10
25% - half and half	5% - half 10%
75% - 50% + 25%	20% - double 10%

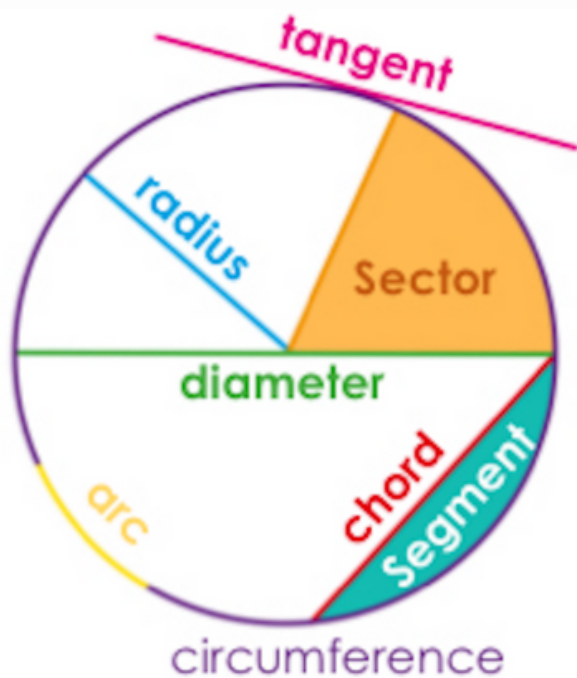
## Rounding

8,378,543

To the nearest 10,000 is 8,380,000  
 To the nearest 100,000 is 8,400,000  
 To the nearest 1,000,000 is 8,000,000  
 To the nearest 10,000,000 is 10,000,000



# Circles



The **diameter** is twice the radius

# 3D Shape Nets

Cube		
Cuboid		
Triangular Prism		
Cylinder		
Pyramid		

# Square Numbers and Square Root

1 <sup>2</sup>	1	√1	1
2 <sup>2</sup>	4	√4	2
3 <sup>2</sup>	9	√9	3
4 <sup>2</sup>	16	√16	4
5 <sup>2</sup>	25	√25	5
6 <sup>2</sup>	36	√36	6
7 <sup>2</sup>	49	√49	7
8 <sup>2</sup>	64	√64	8
9 <sup>2</sup>	81	√81	9
10 <sup>2</sup>	100	√100	10
11 <sup>2</sup>	121	√121	11
12 <sup>2</sup>	144	√144	12
13 <sup>2</sup>	169	√169	13

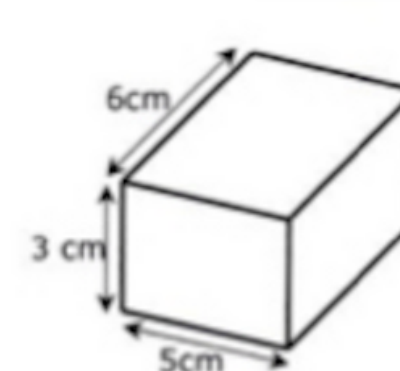
# Algebra

One step equation e.g.  $y + 14 = 20$   
 Undo addition or subtraction  $-14 -14$   
 $y = 6$

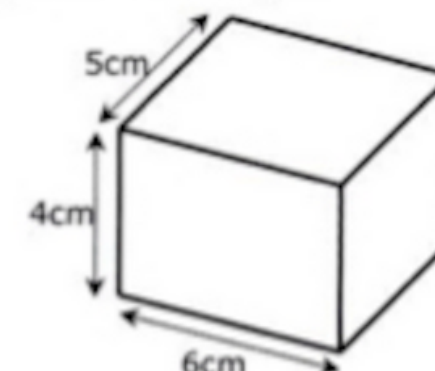
Two step equation e.g.  $2x + 5 = 11$   
 Undo addition or subtraction  $-5 -5$   
 $2x = 6$   
 Undo multiplication or division  $x \div 2 \quad 6 \div 2$   
 $x = 3$

# Volume

volume = length x width x height

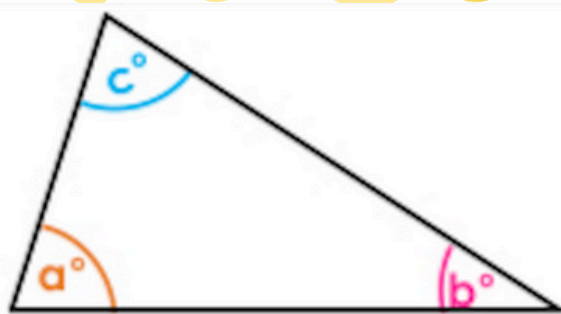


volume =  $6 \times 5 \times 3 = 90 \text{ cm}^3$

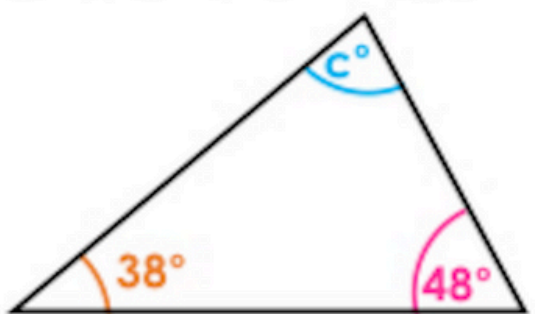


volume =  $5 \times 6 \times 4 = 120 \text{ cm}^3$

# Angles in a Triangle



$a^\circ + b^\circ + c^\circ = 180^\circ$



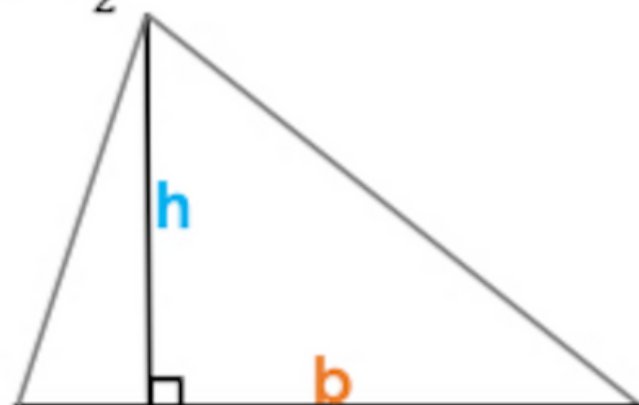
$38^\circ + 60^\circ + c^\circ = 180^\circ$

$c^\circ = 180^\circ - 98$

$c^\circ = 82^\circ$

# Area of a Triangle

Area =  $\frac{1}{2} \times b \times h = \frac{bh}{2}$



# Cube Numbers and Cube Roots

1 <sup>3</sup>	1	√1	1
2 <sup>3</sup>	8	√8	2
3 <sup>3</sup>	27	√27	3
4 <sup>3</sup>	64	√64	4
5 <sup>3</sup>	125	√125	5

# Vocabulary

factors	numbers that you multiply together to get other numbers
multiple	the result of multiplying a number by an integer
HCF	<b>Highest Common Factor</b> - the largest factor shared by two or more numbers
LCM	<b>Lowest Common Multiple</b> - the smallest number that is a multiple of two or more numbers.