

Year 6: Maths Knowledge Organiser

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

Multiplying a fraction by a fraction

$$\frac{3}{5} \times \frac{6}{7} = \frac{3 \times 6}{5 \times 7} = \frac{18}{35}$$

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

Percentages

On a calculator

36% of 76
 0.36×76

Change to a decimal and multiply

Increasing

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

Fraction to %

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

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

Decreasing

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

Without a calculator

50% - half
 25% - half and half
 75% - 50% + 25%

10% - divide by 10
 5% - half 10%
 20% - double 10%

Calculations with mixed numbers

Add Mixed Numbers

$$\begin{aligned} 8\frac{1}{2} + 3\frac{3}{4} \\ &= \frac{17}{2} + \frac{15}{4} \quad \text{Change to improper fractions} \\ &= \frac{17 \times 2}{2 \times 2} + \frac{15}{4} \quad \text{Change to common denominator} \\ &= \frac{34}{4} + \frac{15}{4} \\ &= \frac{49}{4} \quad \text{Add the numerators} \\ &= 12\frac{1}{4} \quad \text{Change to mixed numbers} \end{aligned}$$

Subtract Mixed Numbers

$$\begin{aligned} 8\frac{1}{2} - 4\frac{3}{4} \\ &= \frac{17}{2} - \frac{15}{4} \quad \text{Change to improper fractions} \\ &= \frac{17 \times 2}{2 \times 2} - \frac{15}{4} \quad \text{Change to common denominator} \\ &= \frac{34}{4} - \frac{15}{4} \\ &= \frac{19}{4} \quad \text{Subtract the numerators} \\ &= 4\frac{3}{4} \quad \text{Change to mixed numbers} \end{aligned}$$

Adding fractions

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

$$\begin{aligned} \frac{1}{2} \times \frac{3}{3} &= \frac{3}{6} & \frac{1}{3} \times \frac{2}{2} &= \frac{2}{6} \\ \frac{3}{6} + \frac{2}{6} &= \frac{5}{6} \end{aligned}$$

Mean Average

The sum of all data points divided by the number of data points

Formal methods of multiplication and division

768 + 653 becomes

$$\begin{array}{r} 768 \\ + 653 \\ \hline 1421 \end{array}$$

862 - 514 becomes

$$\begin{array}{r} 862 \\ - 514 \\ \hline 348 \end{array}$$

134 x 27 becomes

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

432 ÷ 15 becomes

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

Answer: 28.8

384 ÷ 11 becomes

$$\begin{array}{r} 34 \text{ r}10 \\ 11 \overline{) 384} \\ \underline{33} \\ 54 \\ \underline{55} \\ -1 \end{array}$$

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 1st then use ODMAS inside the brackets

$$\begin{aligned} 40 - (5 \times 4 + 7) & \quad (2^2) \\ 40 - (20 + 7) & \quad (\text{Multiply } 5 \times 4) \\ 40 - 27 & \quad (\text{Add } 20 + 7) \\ \text{Answer} &= 13 \end{aligned}$$

Ratio

Ratio compares values.
 A **ratio** says how much of one thing there is compared to another thing.
Ratio 3:1. There are 3 blue squares to 1 yellow square.

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Algebra

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

$$\begin{array}{r} y + 14 = 20 \\ -14 \quad -14 \\ \hline y = 6 \end{array}$$

Two step equation e.g. $2x + 5 = 11$
 Undo addition or subtraction

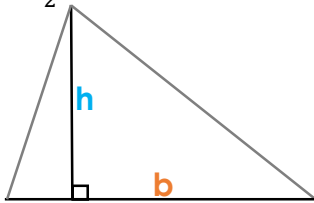
$$\begin{array}{r} 2x + 5 = 11 \\ -5 \quad -5 \\ \hline 2x = 6 \end{array}$$

 Undo multiplication or division

$$\begin{array}{r} x \div 2 \quad 6 \div 2 \\ \hline x = 3 \end{array}$$

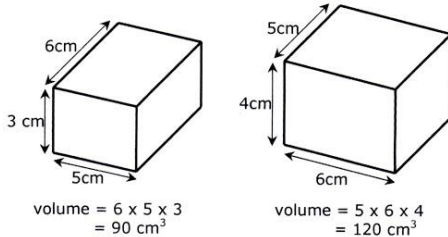
Area of a triangle

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

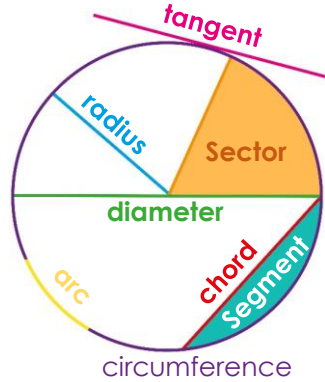


Volume

volume = length x width x height

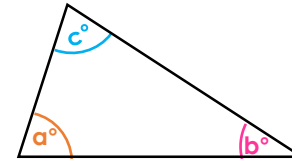


Circles

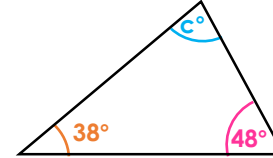


The **diameter** is twice the **radius**

Angles in a triangle



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

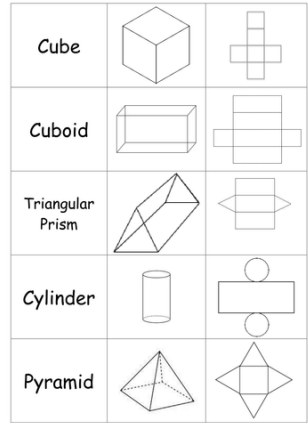


$$38^\circ + 60^\circ + c^\circ = 180^\circ$$

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

$$c^\circ = 82^\circ$$

Nets of 3D shapes



Square Numbers		Square Roots	
1^2	1	$\sqrt{1}$	1
2^2	4	$\sqrt{4}$	2
3^2	9	$\sqrt{9}$	3
4^2	16	$\sqrt{16}$	4
5^2	25	$\sqrt{25}$	5
6^2	36	$\sqrt{36}$	6
7^2	49	$\sqrt{49}$	7
8^2	64	$\sqrt{64}$	8
9^2	81	$\sqrt{81}$	9
10^2	100	$\sqrt{100}$	10
11^2	121	$\sqrt{121}$	11
12^2	144	$\sqrt{144}$	12
13^2	169	$\sqrt{169}$	13

Cube Numbers		Cube Roots	
1^3	1	$\sqrt[3]{1}$	1
2^3	8	$\sqrt[3]{8}$	2
3^3	27	$\sqrt[3]{27}$	3
4^3	64	$\sqrt[3]{64}$	4
5^3	125	$\sqrt[3]{125}$	5

Vocabulary

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