

Year 6: Maths Knowledge Mat

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

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

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

Percentages

On a calculator

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

Increasing

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

Fraction to %

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

(Diagram: 15/20 to 75/100 via x5)

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

Decreasing

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

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

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

$$= \frac{17}{2} + \frac{15}{4} \quad \text{Change to improper fractions}$$

$$= \frac{17 \times 2}{2 \times 2} + \frac{15}{4} \quad \text{Change to common denominator}$$

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

$$= \frac{49}{4} \quad \text{Add the numerators}$$

$$= 12\frac{1}{4} \quad \text{Change to mixed numbers}$$

Subtract Mixed Numbers

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

$$= \frac{17}{2} - \frac{15}{4} \quad \text{Change to improper fractions}$$

$$= \frac{17 \times 2}{2 \times 2} - \frac{15}{4} \quad \text{Change to common denominator}$$

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

$$= \frac{19}{4} \quad \text{Subtract the numerators}$$

$$= 4\frac{3}{4} \quad \text{Change to mixed numbers}$$

Adding fractions

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

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

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

Mean Average

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

BODMAS

B \rightarrow Bracket
 O \rightarrow Of
 D \rightarrow Division
 M \rightarrow Multiplication
 A \rightarrow Addition
 S \rightarrow Subtraction

BODMAS EXAMPLE

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

Brackets 1st then use ODMAS inside the brackets

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

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

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

$$\text{Answer} = 13$$

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.

Formal methods of multiplication and division

134 x 27 becomes

		4	80	28
	30	600	210	
X	100	20	2 000	7 700

Total: 2 680 + 938 = 3 618

564 ÷ 15 becomes

$$15 \overline{) 564}$$

$$\begin{array}{r} 37 \\ 15 \times 30 \\ \hline 450 \\ 114 \\ 15 \times 7 \\ \hline 105 \\ \hline 9 \\ \hline \end{array}$$

Remainders as fractions:

384 ÷ 11 becomes

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

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

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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

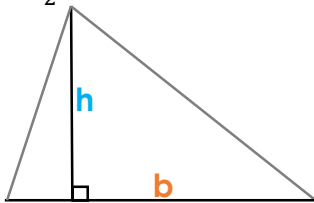
$$\begin{array}{r} 2x + 5 = 11 \\ -5 \quad -5 \\ \hline 2x = 6 \end{array}$$

Undo multiplication or division

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

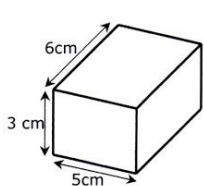
Area of a triangle

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

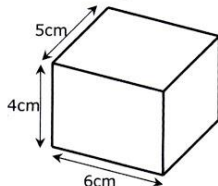


Volume

volume = length x width x height

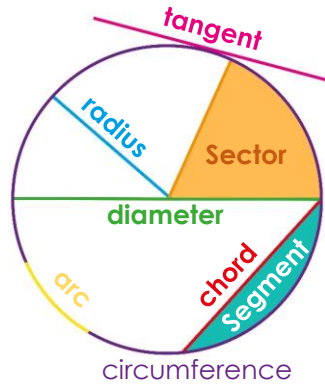


$$\text{volume} = 6 \times 5 \times 3 = 90 \text{ cm}^3$$



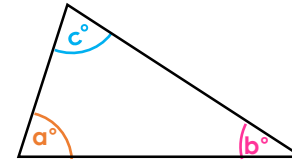
$$\text{volume} = 5 \times 6 \times 4 = 120 \text{ cm}^3$$

Circles

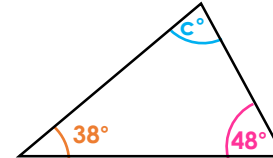


The **diameter** is twice the **radius**

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

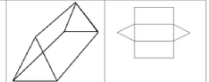
Cube



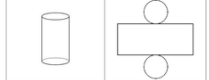
Cuboid



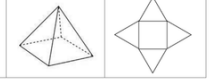
Triangular Prism



Cylinder



Pyramid



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

Cube Numbers	Cube Roots
1 ³	1
2 ³	8
3 ³	27
4 ³	64
5 ³	125

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.