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

$$\frac{3}{5} \times \frac{6}{8} = \frac{3 \times 6}{5 \times 7} = \frac{18}{35}$$

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

Percentages

On a calculator
36% of 76 → Change to a decimal and multiply
0.36 x 76

Fraction to %
x5
$$\frac{15}{20} = \frac{75}{100} = 75\%$$
x5

Or 15÷20 x 100 = 75%

Increasing
Increase £70 by 14%
14% of 70 = 0.14 x 70 = £9.80
New amount = £70 + £9.80
= £79.80

Decreasing
Decrease £70 by 14%
14% of 70 = 0.14 x 70 = £9.80
New amount = £70 - £9.80
= £60.20

Without a calculator
50% - half	10% - divide by 10
25% - half and half	5% - half 10%
75% - 50% + 25%	20% - double 10%

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

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

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

$= \frac{49}{4}$ — Add the numerators

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

Subtract Mixed Numbers

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

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

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

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

$= \frac{19}{4}$ — Subtract the numerators

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

Adding fractions

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

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

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

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

BODMAS

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

BODMAS EXAMPLE

40 – (5 x 2² + 7)

Brackets 1st then use ODMAS inside the brackets

40 – (5 x **4** + 7)	(2²)
40 – (**20** + 7)	(Multiply 5 x 4)
40 - **27**	(Add 20 + 7)
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

```
        2   2
    1   3   4
X       2   7
2   6   8   0
    9   3   8
3   6   1   8
    1   1
```

564 ÷ 15 becomes

```
15 | 5   6   4
     4   5   0      15 X 30
     1   1   4
     1   0   5      15 X 7
         3   7
```
$$\frac{9}{15} = \frac{3}{5}$$
Answer: 37 $\frac{3}{5}$

432 ÷ 15 becomes

```
         2   8 . 8
15 | 4   3   2 . 0
     3   0
     1   3   2
     1   2   0
         1   2   0
         1   2   0
                 0
```
Answer: 28.8

384 ÷ 11 becomes

```
         3   4   r10
            5
11 | 3   8   4
```
Answer: 34 $\frac{10}{11}$

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Algebra

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

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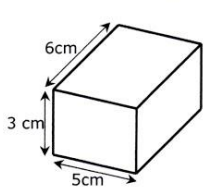Undo multiplication or division $x \div 2\qquad 6 \div 2$
$x\qquad = 3$

Area of a triangle

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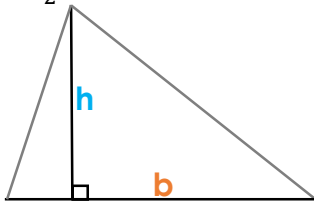
Volume

volume = length x width x height

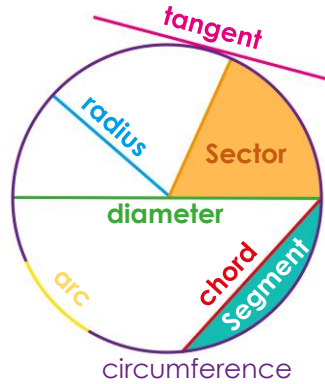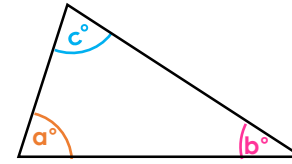volume = 6 x 5 x 3
= 90 cm³

volume = 5 x 6 x 4
= 120 cm³

Circles

tangent, radius, diameter, Sector, arc, chord, Segment, circumference
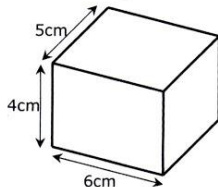
The **diameter** is twice the **radius**

Angles in a triangle

$a° + b° + c° = 180°$
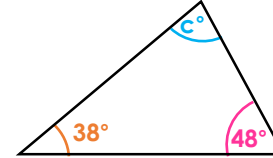
$38° + 60° + c° = 180°$
$c° = 180° - 98$
$c° = 82°$

Nets of 3D shapes

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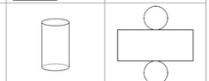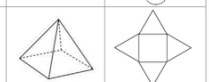
Square Numbers		Square Roots	
1^2	1	$\sqrt{1}$	1
2^2	4	$\sqrt{4}$	2
3^2	9	$\sqrt{9}$	3
4^2	16	$\sqrt{16}$	4
5^2	25	$\sqrt{25}$	5
6^2	36	$\sqrt{36}$	6
7^2	49	$\sqrt{49}$	7
8^2	64	$\sqrt{64}$	8
9^2	81	$\sqrt{81}$	9
10^2	100	$\sqrt{100}$	10
11^2	121	$\sqrt{121}$	11
12^2	144	$\sqrt{144}$	12
13^2	169	$\sqrt{169}$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

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