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
0.36 x 76
Change to a decimal and multiply

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

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

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

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

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

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

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

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

Brackets 1st then use ODMAS inside the brackets

$40 - (5 \times \mathbf{4} + 7)$	(2^2)
$40 - \mathbf{(20 + 7)}$	(Multiply 5 x 4)
$40 - \mathbf{27}$	(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.
Undo addition or subtraction

$$y + 14 = 20$$
$$-14 \quad -14$$
$$y = 6$$

Two step equation e.g.
Undo addition or subtraction

Undo multiplication or division

$$2x + 5 = 11$$
$$-5 \quad -5$$
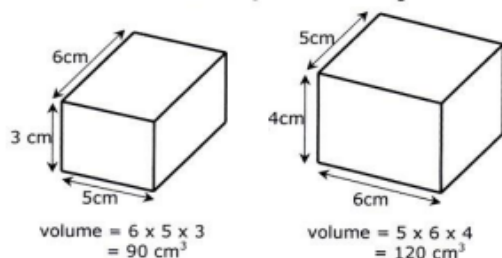$$2x = 6$$
$$x \div 2 \quad 6 \div 2$$
$$x = 3$$

Area of a triangle

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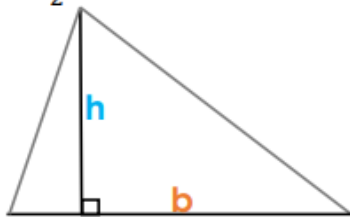
Volume

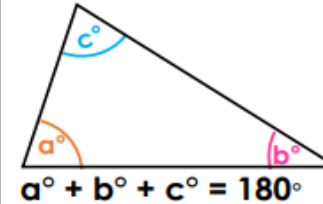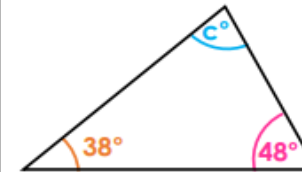volume = length x width x height

volume = 6 x 5 x 3 = 90 cm³

volume = 5 x 6 x 4 = 120 cm³

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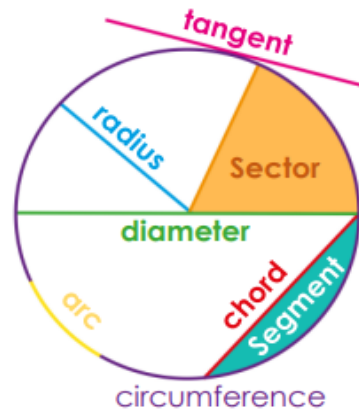
The **diameter** is twice the **radius**

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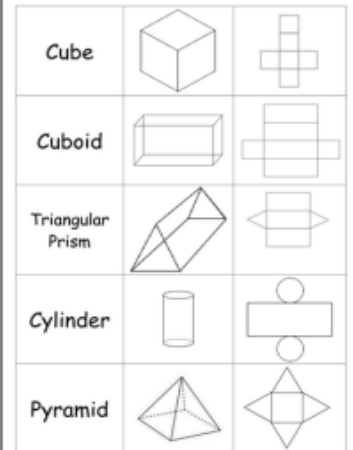
Square Numbers		Square Roots	
1^2	1	$\sqrt{1}$	1
2^2	4	$\sqrt{4}$	2
3^2	9	$\sqrt{9}$	3
4^2	16	$\sqrt{16}$	4
5^2	25	$\sqrt{25}$	5
6^2	36	$\sqrt{36}$	6
7^2	49	$\sqrt{49}$	7
8^2	64	$\sqrt{64}$	8
9^2	81	$\sqrt{81}$	9
10^2	100	$\sqrt{100}$	10
11^2	121	$\sqrt{121}$	11
12^2	144	$\sqrt{144}$	12
13^2	169	$\sqrt{169}$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