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

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

$\frac{3}{4} \times \frac{1}{3} = \frac{3 \times 1}{4 \times 3} = \frac{3}{12} =$ 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 %

$\frac{15}{20} \xrightarrow{\times 5} \frac{75}{100} = 75\%$

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

Calculations with mixed numbers

Add Mixed Numbers

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

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

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

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

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

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 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.
Undo addition or subtraction

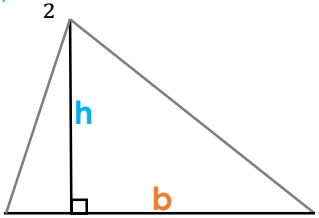
$y + 14 = 20$
$-14 \quad -14$
$y = 6$

Two step equation e.g.
Undo addition or subtraction
Undo multiplication or division

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

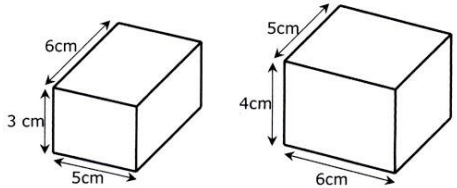
Area of a triangle

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



Volume

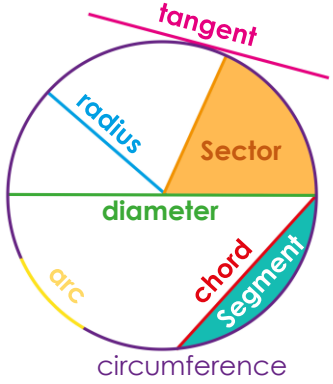
volume = length x width x height



volume = 6 x 5 x 3
= 90 cm³

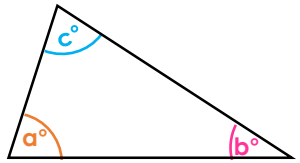
volume = 5 x 6 x 4
= 120 cm³

Circles

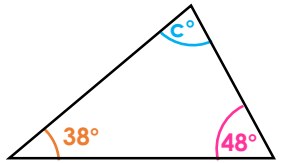


The **diameter** is twice the **radius**

Angles in a triangle

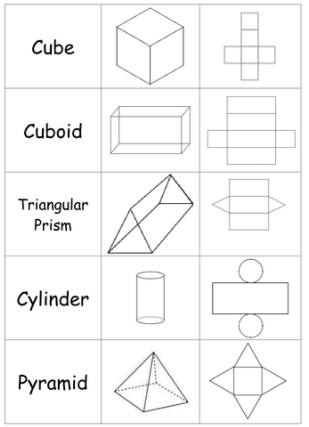


a° + b° + c° = 180°



38° + 60° + c° = 180°
c° = 180° - 98
c° = 82°

Nets of 3D shapes



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.