

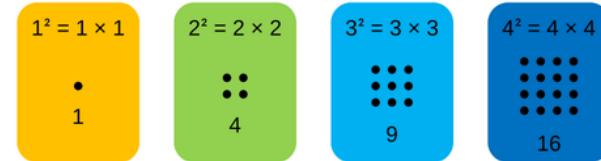
Year 8 - Mathematics - Autumn Term: Helpful Hints



Key Word	Definition
Factor	A number that divides a given number exactly, leaving no remainder.
Multiple	The result of one number multiplied by another number.
Square Number	The answer when a number has been multiplied by itself.
Cube Number	The answer when a number is multiplied by itself and then by itself again.
Prime Numbers	A whole number that has exactly two factors.

Square Numbers:

1, 4, 9, 16, 25, 36, 49, 64, 81, 100, ...



The pattern of dots gives a clue as to where the name square numbers come from...

Multiplication Grid:

X	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

Prime Number Grid:

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

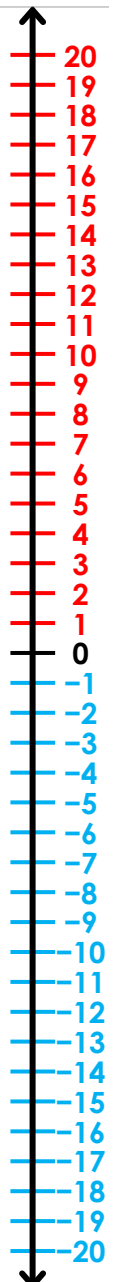
Cube Numbers:

1 is the first cube number, because $1 \times 1 \times 1 = 1$

8 is the second cube number, because $2 \times 2 \times 2 = 8$

27 is the third cube number, because $3 \times 3 \times 3 = 27$

64 is the fourth cube number, because $4 \times 4 \times 4 = 64$



Year 8 - Mathematics - Autumn Term: Number



Rounding

5, 6, 7, 8, 9 round up, 0, 1, 2, 3, 4 round down

Nearest 10: $6 \mid 5 \rightarrow 70$

Nearest 100: $63 \mid 23 \rightarrow 6300$

Nearest 1000: $9 \mid 763 \rightarrow 10000$

Whole Number/Integer: $478 \mid .4389 \rightarrow 478$

1 Decimal Place: $4.8 \mid 325 \rightarrow 4.8$

2 Decimal Place: $1.89 \mid 7 \rightarrow 1.90$

1 Significant Figure: $5 \mid 87 \rightarrow 600$

1 Significant Figure: $0.006 \mid 488 \rightarrow 0.006$

2 Significant Figures: $75 \mid 68 \rightarrow 7600$

3 Significant Figures: $0.0799 \mid 7 \rightarrow 0.0800$

Multiples:

Multiples of 4: 4, 8, 12, 16, 20, 24, ...

Find the Lowest Common Multiple of 3 and 8:

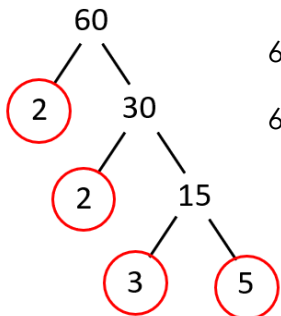
Multiples of 3: 3, 6, 9, 12, 15, 18, 21, 24, 27,

Multiples of 8: 8, 16, 24,

LCM = 24

Product of Prime Factors:

Write 60 as a product of its prime factors



$$60 = 2 \times 2 \times 3 \times 5$$

$$60 = 2^2 \times 3 \times 5$$

Estimating

Anne spent £5.82 on lunch and £6.47 on dinner. Approximately how much did she spend in total?

$$\approx \pounds 6 + \pounds 6 = \pounds 12$$

$$6.35 \times 7.662 \approx 6 \times 8 = 48$$

$$\frac{2.57+9.45}{0.5236} \approx \frac{3+9}{0.5} = \frac{12}{0.5} = 24$$

$$\frac{\sqrt{861.5}-4.55^2}{24.5+4.91} \approx \frac{\sqrt{900}-5^2}{20+5} = \frac{30-25}{25} = \frac{5}{25} = \frac{1}{5} \text{ or } 0.2$$

Factors:

Factors of 30- write these in multiplication pairs.

1	30
2	15
3	10
5	6

Find the Highest Common Factor of 16 and 20

Find all the factors of both numbers and choose the highest factor that is in both lists.

Factors of 16

1	16
2	8
4	4

Factors of 20

1	20
2	10
4	5

Highest common factor = 4

Fractions, Decimals and Percentages

Important ones to learn:

Fraction	Decimal	Percentage
$\frac{1}{2}$	0.5	50%
$\frac{1}{4}$	0.25	25%
$\frac{1}{5}$	0.2	20%
$\frac{1}{3}$	0.3	33.3%
$\frac{2}{3}$	0.6	66.6%
$\frac{1}{10}$	0.1	10%
$\frac{1}{100}$	0.01	1%

Year 8 - Mathematics - Autumn Term: Number



Calculations with decimals

Adding Decimals

$$2.24 + 0.6$$

	2	.	2	4	
+	0	.	6	0	
<hr/>					
	2	.	8	4	

Subtracting Decimals

$$0.42 - 0.25$$

			3	1	
	0	.	4	2	
-	0	.	2	5	
<hr/>					
	0	.	1	7	

Multiplying Decimals

$$1.5 \times 1.2 = 1.8$$

$$\begin{array}{r} \times 10 \downarrow \quad \times 10 \downarrow \\ 15 \times 12 = 180 \\ \div 10 \downarrow \\ \div 10 \downarrow \\ 1.8 \end{array}$$

Dividing Decimals

$$4.8 \div 0.6$$

$$\frac{4.8}{0.6} = \frac{48}{6} = 8$$

So $4.8 \div 0.6 = 8$

Calculations with Fractions

Adding Fractions

Fractions must have the same denominator.

$$\begin{array}{c} \times 2 \qquad \qquad \times 5 \\ \frac{1}{5} + \frac{1}{2} = \frac{7}{10} \\ \times 2 \qquad \qquad \times 5 \\ \downarrow \qquad \qquad \downarrow \\ \frac{2}{10} + \frac{5}{10} = \frac{7}{10} \end{array}$$

Subtracting Fractions

Fractions must have the same denominator.

$$\begin{array}{c} \times 5 \qquad \qquad \times 4 \\ \frac{1}{4} - \frac{1}{5} = \frac{1}{20} \\ \times 5 \qquad \qquad \times 4 \\ \downarrow \qquad \qquad \downarrow \\ \frac{5}{20} - \frac{4}{20} = \frac{1}{20} \end{array}$$

Multiplying Fractions

Multiply the numerators and denominators together.

$$\begin{array}{c} (1 \times 2) \\ \frac{1}{3} \times \frac{2}{3} = \frac{2}{9} \\ (3 \times 3) \end{array}$$

Dividing Fractions

Keep it, Change it, Flip it.

$$\begin{array}{c} \text{Change the sign.} \\ \text{Flip the divisor.} \\ \frac{1}{5} \div \frac{1}{3} = \\ \frac{1}{5} \times \frac{3}{1} = \frac{3}{5} \end{array}$$

Year 8 - Mathematics - Autumn Term: Geometry

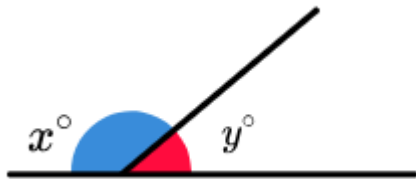


Key Definitions

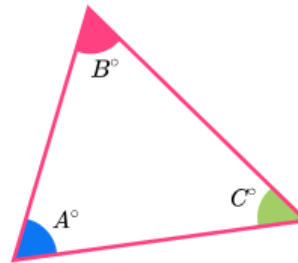
Key Word	Definition
Acute	Less than 90°
Obtuse	Between 90° and 180°
Reflex	More than 180°
Parallel Lines	Two lines that are equal distance from each other that will never meet.

Angle Facts:

Angles on a straight line add to 180°

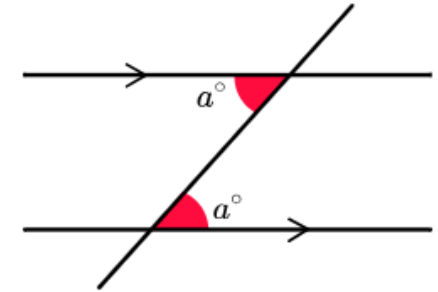


Angles in a triangle add to 180°

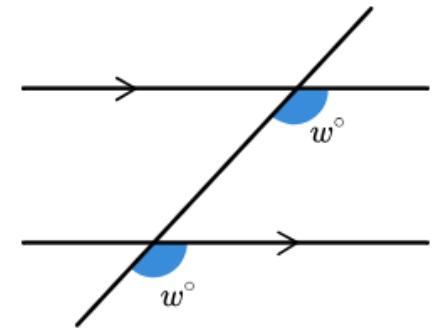


Angles in Parallel Lines

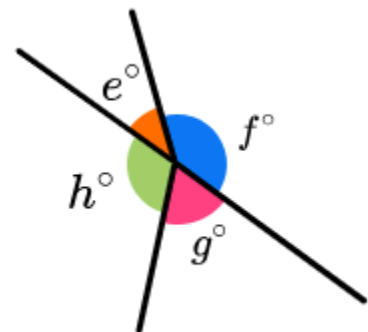
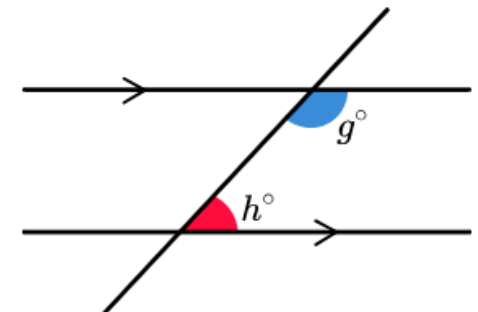
Alternate angles are equal



Corresponding angles are equal

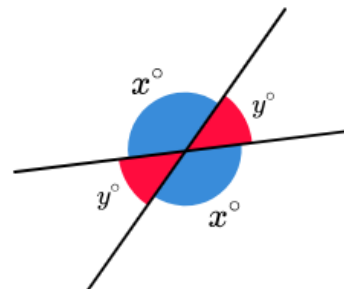


Co-interior angles add to 180°



Angles around a point add to 360°

Vertically opposite angles are equal



Year 8 - Mathematics - Autumn Term: Algebra



Key Definitions

Key Word	Definition
Simplify	Collecting like terms within an expression.
Expand	Multiply out a bracket.
Factorise	Put brackets into an expression by taking out the highest common factor.
Solve	Replacing variables in an expression with their numerical values.

Topic Vocabulary

Variable	A letter to represent a value. The value can change.
Coefficient	The number attached a variable.
Term	The separate parts of expressions, Or equations
Expression	Any combination of letters & numbers.
Equation	Two equal expressions. They can be solved to find the value of variables.
Formula	Two equal expressions. Values are substituted to evaluate one variable.

Solving Equations

Solve:

$$\begin{array}{r}
 2x + 8 = 18 \\
 \left. \begin{array}{l} -8 \\ \hline \end{array} \right\} -8 \\
 2x = 10 \\
 \left. \begin{array}{l} \div 2 \\ \hline \end{array} \right\} \div 2 \\
 x = 5
 \end{array}$$

How can we check?

$$(2 \times 5) + 8 = 18$$



$$2x + 5$$

Changing the Subject of the Formula

(Rearrange to make it $x = \dots$)

$$2x + 5$$

$$2x + 5$$

$$2x + 5$$

$$2x + 5 = 8$$

$$A = \frac{b \times h}{2}$$

$$\begin{array}{r}
 y = 2x + 5 \\
 \left. \begin{array}{l} -5 \\ \hline \end{array} \right\} -5 \\
 y - 5 = 2x \\
 \left. \begin{array}{l} \div 2 \\ \hline \end{array} \right\} \div 2 \\
 \frac{y - 5}{2} = x
 \end{array}$$