

Year 7 - Maths - Spring Term

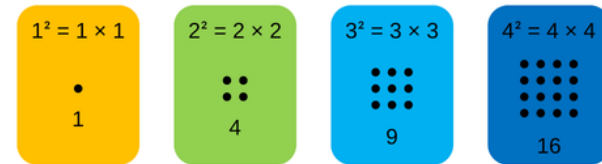


Helpful Hints

| 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:

| × | 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 $4 \times 4 \times 4 = 64$

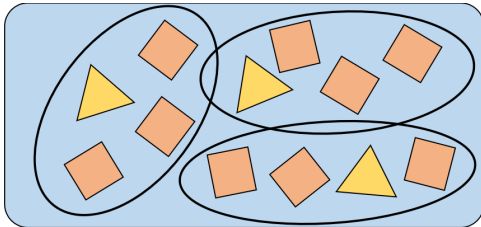


Year 7 - Maths - Spring Term - Number



| Key Word | Definition |
|-----------------------------|---|
| Ratio and Proportion | A multiplicative relationship between values. |
| Term | An individual value in a sequence |
| Nth Term | A formula used to find any term of a sequence, where n stands for the term number |

Simplifying a Ratio



What is the ratio of **Triangles to Squares** ?

3 : 9

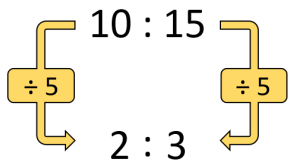
We can **simplify** this ratio.

1 : 3

"For every triangle there are 3 squares."

Simplify this ratio.

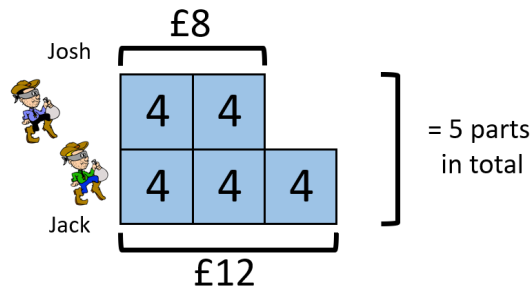
What **factor** are both numbers **divisible** by?



Sharing in a Ratio

Josh and Jack the bandits stole **£20** from the bank!
They divided it in the ratio **2 : 3**
How much did they each get?

Draw a **Bar Model** to calculate how much **one part** is worth. $£20 \div 5 =$
 $£4$ per part



So, Josh gets £8, and Jack gets £12.

Sequences

Fibonacci Sequences

A special sequence starting with 1, 1. Find the next term by adding the previous two and continue in this way.

1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, ...

Generating a Sequence

Use the nth term to find any term in the sequence:

$$nth \text{ term} = 6n + 2$$

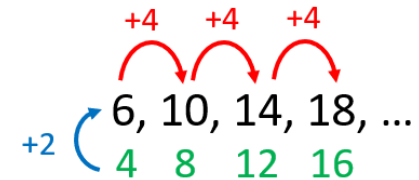
What is the 10th term in this sequence?

$$10^{th} \text{ term} = (6 \times 10) + 2$$

Substitute $n = 10$

$$= 60 + 2 = 62$$

Finding the Nth Term



- 1) What times table is hidden in the sequence?
- 2) What do we need to add/subtract to make the sequences match?

$$nth \text{ term formula} = (4 \times n) + 2$$

$$= 4n + 2$$

Year 7 - Maths - Spring Term - Number



Rounding

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

Nearest 10: 6 | 5 → 70

Nearest 100: 63 | 23 → 6300

Nearest 1000: 9 | 763 → 10000

Whole Number/Integer: 478 | .4389 → 478

1 Decimal Place: 4.8 | 325 → 4.8

2 Decimal Place: 1.89 | 7 → 1.90

1 Significant Figure: 5 | 87 → 600

1 Significant Figure: 0.006 | 488 → 0.006

2 Significant Figures: 75 | 68 → 7600

3 Significant Figures: 0.0799 | 7 → 0.0800

Multiples:

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

Find the Lowest Common Multiple of 3 and 8:

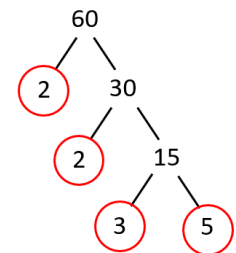
Multiples of 3: 3, 6, 9, 12, 15, 18, 21, 24, 27,

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

Key Percentages

Use the following methods to work these key percentages **without** a calculator

| Percentage | Non-Calc Method |
|------------|-----------------|
| 10% | ÷ 10 |
| 5% | ÷ 10 ÷ 2 |
| 1% | ÷ 100 |
| 25% | ÷ 4 |
| 50% | ÷ 2 |

Year 7 - Maths - Spring Term - Geometry

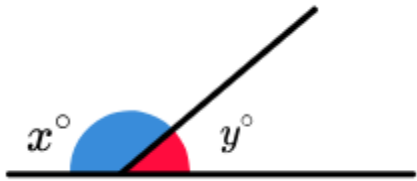


Key Definitions

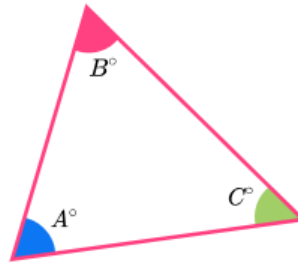
| Key Word | Definition |
|----------------|---|
| Acute | Less than 90° |
| Obtuse | Between 90° and 180° |
| Reflex | More than 180° |
| Parallel Lines | Two lines that are equal distance from each other that will never meet. |

Angle Facts:

Angles on a straight line add to 180°

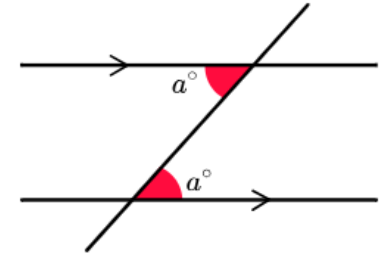


Angles in a triangle add to 180°

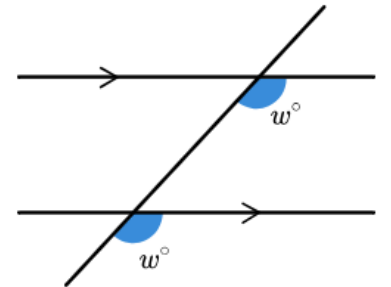


Angles in Parallel Lines

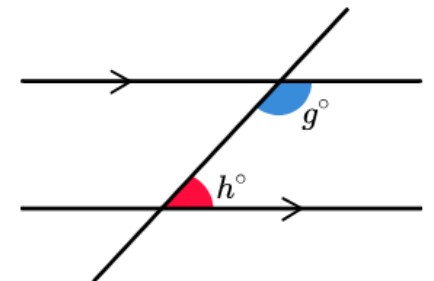
Alternate angles are equal



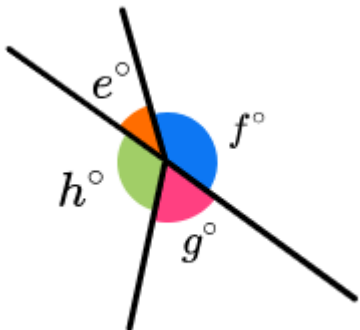
Corresponding angles are equal



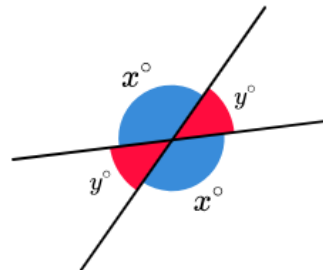
Co-interior angles add to 180°



Angles around a point add to 360°



Vertically opposite angles are equal



Year 7 - Maths - Spring 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. |

Expanding Brackets

To expand brackets, you need to multiply everything inside the brackets by whatever is outside the bracket.

$$5(3x + 1) = 15x + 5$$

Factorising

Factorising is simply the reverse of expanding brackets. To factorise an expression completely, we take the highest common factor (**HCF**) of each term and place this outside the bracket.

$$6x + 24$$

$$(a) 2(3x + 12) \quad (b) 3(2x + 8) \quad (c) 6(x + 4) \checkmark$$

Solving Equations

The word solve means to find the value of the variable, typically x

Solve:

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

Topic Vocabulary

| | | |
|--------------------|--|----------------------------|
| Variable | A letter to represent a value. The value can change. | $2x + 5$ |
| Coefficient | The number attached a variable. | $2x + 5$ |
| Term | The separate parts of expressions, Or equations | $2x + 5$ |
| Expression | Any combination of letters & numbers. | $2x + 5$ |
| Equation | Two equal expressions. They can be solved to find the value of variables. | $2x + 5 = 8$ |
| Formula | Two equal expressions. Values are substituted to evaluate one variable. | $A = \frac{b \times h}{2}$ |

Year 7 - Maths - Spring Term - Data



Key Definitions

| Key Word | Definition |
|---------------|--|
| Mean | The average of a data set, found by adding all numbers together and then dividing the sum of the numbers by the number of numbers. |
| Median | Another type of average of a data set. The middle number; found by ordering all data points and picking out the one in the middle |
| Mode | The mode is the most common number that appears in your set of data. |
| Range | A way of measuring the spread of the data. The difference between the largest value and smallest value within the data. |

Calculating the Mean

$$\text{Mean} = \frac{\text{Sum of all values}}{\text{Total number of values}}$$

Example :

8, 3, 10, 4, 2, 6, 2

$$\begin{aligned} \text{Mean} &= (2+2+3+4+6+8+10) \div 7 \\ &= 35 \div 7 \\ &= 5 \end{aligned}$$

Calculating the Mode

The mode is the number or numbers that appear the most. It can be more than one value.

3, 1, 5, 1, 1, 3, 7



1, 1, 1, 3, 3, 5, 7

Mode = 1

7, 2, 4, 3, 9



2, 3, 4, 7, 9

Mode = No Mode

Calculating the Median

To find the middle number of the data, we must first order the data from smallest to largest.

Example:

place in order

8, 3, 10, 4, 2, 6, 2

↓

2, 2, 3, 4, 6, 8, 10

x x x x x x x

Median = 4

For an even number of data values, there will be two numbers left in the middle. To get the median, we need the middle of these two values.

Example:

place in order

6, 3, 1, 4, 7, 0, 3, 8

↓

0, 1, 3, 3, 4, 6, 7, 8

x x x x x x x

Median = 3.5

Calculating the Range

To find the **range** work out the difference between the largest and smallest values.

Example:

6, 3, 1, 4, 7, 0, 3, 8

↓

0, 1, 3, 3, 4, 6, 7, 8

Range = 8 - 0 = 8

Year 7 - Maths - Spring Term - Calculator Skills



Important buttons on your calculator:

- **Equals button** →
- **Power of 2** - e.g. $3^2 = 9$ →
- **Any power** - e.g. $2^3 = 8$ →
- **Square root** - e.g. $\sqrt{16} = 4$ →
- **Any root** - e.g. $\sqrt[3]{27} = 3$ →
- **Fraction button** - e.g. $\frac{3}{4}$ →
- **Pi button** - e.g. π → (This one is in blue above the number 7 so we must press the blue shift button first!)

Helpful Hints

- Convert your answer to a decimal use the **FORMAT** button and select "decimal." →
- Use the delete button to remove a mistake rather than deleting the whole thing. →
- Use the keypad to move the cursor around the calculation you have typed in on the screen. →

Check

Can you type these questions in your calculator and get the following answers...

- $8.3^3 = 571.787$
- $\frac{7.5^2 - 1.2}{5} = 11.01$
- $\sqrt{37} - 1.71 = 4.37276253$

Use the QR code to watch a short video on how to use your calculator

Any Power → x^y button

Power of 2 → x^2 button

Delete button → \times button

Equals button → EXE button

Square root → $\sqrt{\quad}$ button

Fraction button → $\frac{\square}{\square}$ button

Pi button (shift first) → π button (above 7)

To convert to a decimal → FORMAT button