**Year 6**

**6/1 Place value in numbers to 10million**

The position of the digit gives its size

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Ten millions | Millions | Hundred thousands | Ten thousands | thousands | hundreds | tens | units |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** |

Example

The value of the digit ‘**1**’ is **10** 000 000

The value of the digit ‘**2**’ is **2** 000 000

The value of the digit ‘**3**’ is **3**00 000

The value of the digit ‘**4**’ is **4**0 000

**6/1 Round whole numbers**

**Example** 1– Round 3**42** 679 to the nearest 10 000

* Step 1 – Find the ‘round-off digit’ - **4**
* Step 2 – Move one digit to the right - **2**

4 or less? YES – leave ‘round off digit’ unchanged

 - Replace following digits with zeros

ANSWER – 3**4**0 000

**Example** 2– Round 3**45** 679 to the nearest 10 000

* Step 1 – Find the ‘round-off digit’ - **4**
* Step 2 – Move one digit to the right - **5**

5 or more? YES – add one to ‘round off digit’

 - Replace following digits with zeros

ANSWER – 3**5**0 000

**6/2 Negative numbers**

 l l l l l l l

-3 -2 -1 0 1 2 3

**2** > **-2** We say 2 is bigger than -2

**-2** < **2** We say -2 is less than 2

The difference between 2 and -2 = 4 (see line)

Remember the rules:

* When subtracting go down the number line
* When adding go up the number line
* 8 + - 2 is the same as 8 – 2 = 6
* 8 - + 2 is the same as 8 – 2 = 6
* 8 - - 2 is the same as 8 + 2 = 10

**6/3 Multiply numbers & estimate to check**

e.g. 152 x 34 **COLUMN METHOD**

 152

 34x

 608 (x4)

 4560 (x30)

 **5168**

**6/3 Use estimates to check calculations**

152 x 34

≈ is the symbol for ‘roughly equals’

≈150 x 30

≈4500

**6/3 Divide numbers & estimate to check**

**With a remainder also expressed as a fraction**

e.g. 4928 ÷ 32 **BUS SHELTER METHOD**

 0 2 8 0 2 8 r 12

 15 4 3 2 15 443132

 -3 0

 1 3 2

 -1 2 0

 1 2

 ANSWER - 432 ÷ 15 = **28 r 12**

 **=28**

**6/3 continued**

**With a remainder expressed as a decimal**

 0 2 8 . 8 0 2 8 . 8

 15 4 3 2 . 0 15 443132 .120

 -3 0

 1 3 2

 -1 2 0

 1 2

 ANSWER - 432 ÷ 15 = **28 . 8**

**6/3 Use estimates to check calculations**

 432 ÷ 15

≈ 450 ÷ 15

≈ 30

**6/4 Factors, multiples & primes**

* **FACTORS** are what divides exactly into a number

e.g. Factors of 12 are: Factors of 18 are:

 1 12 1 18

 2 6 2 9

 3 4 3 6

The common factors of 12 & 18 are: 1, 2, 3, 6,

The Highest Common Factor is: 6

* **PRIME NUMBERS** have only TWO factors

e.g. Factors of 7 are: Factors of 13 are

 1 7 1 13

So 7 and 13 are both prime numbers

* **MULTIPLES** are the times table answers

e.g. Multiples of 5 are: Multiples of 4 are:

5 10 15 **20**  25 ...... 4 8 12 16  **20** .......

The Lowest Common Multiple of 5 and 4 is: **20**

**6/5 Order of operations**

**B**racket

**I**ndices

**D**ivide

Do these in the order they appear

**M**ultiply

**A**dd

Do these in the order they appear

**S**ubtract

e.g. 3 + 4 x 6 – 5 = 22

 first

 (2 + 1) x 3 = 9

 first

**6/6 Addition**

* **Line up the digits in the correct columns**

e.g. 48p + £2.84 + £9

 0 . 4 8

 2 . 8 4

 9 . 0 0+

 £1 2 . 3 2

 1 1 1

**6/6 Subtraction**

* **Line up the digits in the correct columns**

e.g. 645 - 427 H T U

 6 34 15

 4 2 7 -

 2 1 8

**6/7 Equivalent fractions**

* To simplify a fraction

Example: 

First find the highest common factor of the numerator and denominator – which is 9, then divide

÷9

  = 

÷9

* To change fractions to the same denominator

 Example:  and 

Find the highest common multiple of the denominators – which is 12, then multiply:

x4

x3

  = and  = 

x4

x3

**6/8 Add & subtract fractions**

* Make the denominators the same

e.g.  +  e.g.  - 

 = + =  - 

 =  = 

Do not add denominators

**6/9 Multiply fractions**

* Write 5 as 
* Multiply numerators & denominators

e.g. 5 x  e.g.  x 

 = x = 

 =  = 3

**6/9 Divide fractions**

* Write 5 as 
* Invert the fraction after ÷ sign
* Multiply numerators & denominators

e.g.  ÷ 5 e.g.  ÷ 

 =  x  =  x 

 =  = = 1 = 1

**6/10 Multiply/divide decimals by 10, 100**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| thousands | hundreds | tens | units | . | tenths | hundredths | thousandths |
| 4 | 3 | 5 | 2 | . | 6 | 1 | 7 |

* **To multiply by 10,** move each digit one place to the left

e.g. 35.6 x 10 = 356

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Hundreds | Tens | Units |  | tenths |
|  | 3 | 5 | 6 |
| 3 | 5 | 6 |  |

* **To divide by 10,** move each digit one place to the right

e.g. 35.6 ÷ 10 = 356= 3.56

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tens | Units |  | tenths | hundredths |
| 3 | 5 | 6 |  |
|  | 3 | 5 | 6 |

* **To multiply by 100,** move each digit 2 places to the left
* **To divide by 100,** move each digit 2 places to the right

**AN ALTERNATE METHOD**

Instead of moving the digits

Move the decimal point the opposite way

**6/11 Multiply decimals**

Step 1 – remove the decimal point

Step 2 – multiply the two numbers

Step 3 – Put the decimal back in

Example: 0.06 x 8

 => 6 x 8

 => 48

 => 0.48

**6/11 Divide decimals**

Use the bus shelter method

Keep the decimal point in the same place

Add zeros for remainders

Example: 6.28 ÷ 5

 1 . 2 5 6

5 ) 6 . 122830

**6/12 Fraction, decimal, percentage**

 **equivalents**

**LEARN THESE:**

 = 0.25 = 25%

 = 0.5 = 50%

 = 0.75 = 75%

 = 0.1 = 10%

* **Percentage to decimal to fraction**

27% = 0.27 = 

7% = 0.07 = 

70% = 0.7 =  = 

* **Decimal to percentage to fraction**

0.3 = 30% = 

0.03 = 3% = 

0.39 = 39% = 

* **Fraction to decimal to percentage**

 = = 80% = 0.8

*Change to 100*

0. 3 7 5

 = 3 ÷ 8 = 8) 3.306040 = 0.375 = 37.5%

 =  = 0.75 = 75%

Cancel by 3

**6/13 Fraction of quantity**

* 4 means ÷ 5 x 4

5

e.g. To find 4 of £40

 5

 £40 ÷ 5 x 4 = £40

**6/13 Percentage of quantity**

Use only

* 50% - 
* 10% - 
* 1% - 

Example : To find 35% of £400

 10% = £40

 20% = £80

 5% = £20

 35% = £140

**6/14 Similar shapes**

When a shape is enlarged by a scale factor the two shapes are called SIMILAR shapes

x2

 5cm

3m

 b 6m a

 8cm

÷2

Scale factor = 6 ÷ 3 = 2

Length a = 5 x 2 = 10cm

Length b = 8 ÷ 2 = 4cm

**6/14 Unequal sharing**

**Example- unequal sharing of sweets**

 A gets B gets

 3 shares 4 shares

 => 3 sweets 4 sweets

x4

x4

 => 12 sweets 16 sweets

**6/15 Express missing numbers**

 **algebraically**

An unknown number is given a letter

Examples

2a = 12 so a = 6

2a – 4 = 8

b + 32 = 180 so b = 1480

 b 320

 30cm

 18cm c

18 + c = 30 so c = 12

 d d

3d = 3600 so d = 1200

 d

**6/15 Use a word formula**

Example: -Time to cook a turkey

Cook for 45min per kg weight

Then a further 45min

For a 6kg turkey, follow the formula:

45min x 6 + 45min

=270min + 45min

=315min

= 5h 15min

**6/16 Number sequences**

* **Understand position and term**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Position | 1 | 2 | 3 | 4 |
| Term | 3  | 7 | 11 | 15 |

 +4

Term to term rule = +**4**

Position to term rule is x **4** - 1

*(because position 1 x 4 – 1 = 3)*

nth term = n x 4 -1 = 4n - 1

* **Generate terms of a sequence**

If the nth term is 5n + 1

1st term *(n=1)* = 5x1 + 1 = 6

2nd term *(n=2)* = 5x2 + 1= 11

3rd term *(n=3)* = 5x3 + 1 = 16

**6/17 Possible solutions of a number**

 **sentence**

Example: x and y are numbers

Rule: x + y = 5

Possible solutions: x = 0 and y = 5

 x = 1 and y = 4

 x = 2 and y = 3

 x = 3 and y = 2

 x = 4 and y = 1

 x = 5 and y = 0

**6/18 Convert units of measure**

**METRIC**

When converting measurements follow these rules:

• When converting from a **larger unit to a smaller** unit we **multiply** (x)
• When converting from a **smaller unit to a larger** unit we **divide** (÷)

UNITS of LENGTH

10mm = 1cm

100cm = 1m

1000m = 1km

UNITS of TIME

60sec = 1 min

60min = 1 hour

24h = 1 day

365days = 1 year

UNITS of MASS

1000g = 1kg

1000kg = 1tonne

UNITS of VOLUME

1000ml = 1 litre

100cl = 1litre

**6/19 Convert units of measure**

**METRIC/IMPERIAL**

LEARN: 5 miles = 8km

 Miles ÷ 5 x8 kilometres

 Miles x 5 ÷8 kilometres

**6/20 Perimeter and area of shapes**

Shapes can have the SAME area but different perimeters

The area of each shape is 9 squares

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  | B |  |  |
|  |  | A |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  | C |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |

Perimeter of each shape is different

A – 12; B – 14; C -16

**6/21 Area of parallelogram & triangle**

* **Area of parallelogram**

Area of parallelogram = b x h 5cm

 = 8 x 5

 = 40cm2 8cm

* **Area of triangle (½ a parallelogram)**

Area of triangle = b x h

 2

= 8 x 5 5cm

 2

 20cm2

8cm

**6/22 Volume**

* **Volume of cuboid**

Volume = l x w x h

 = 5 x 3 x 2

 = 30cm3 3cm

 2cm

 5cm

* **Volume of cube**

Volume = l x w x h

 = 3 x 3 x 3

 = 27m3 3m

 3m

 3m

**6/23 Construct 2D shapes**

Example : Triangle with side and angles given

* Draw line AB = 7cm
* Draw angle 340 at point A from line AB
* Draw angle 470 at point B from line AB
* Extend to intersect the lines at C

C

470

340

B

A

7cm

**6/23 Construct 3D shapes**

CUBE & its net

CUBOID & its net

TRIANGULAR PRISM & its net

****

**6/24 Properties of shapes**

TRIANGLES – sum of angles = 1800

ISOSCELES triangle

2 equal sides & 2 equal angles

EQUILATERAL triangle

3 equal sides & ALL angles 600

SCALENE triangle

All sides & angles different

QUADRILATERALS – sum of angles = 3600

 Square rectangle parallelogram

 Rhombus trapezium kite

REGULAR POLGONS – all sides the same

* Polygons have straight sides
* Polygons are named by the number sides

 3 sides – triangle

4 sides – quadrilateral

 5 sides – pentagon

 6 sides – hexagon

 7 sides – heptagon

 8 sides – octagon

 9 sides – nonagon

 10 sides – decagon

* Sum of exterior angles is always 3600

 1080 720

* interior & exterior angle add up to 1800
* the interior angles add up to:

Triangle =1 x 1800 = 1800

Quadrilateral =2 x 1800 = 3600

Pentagon =3 x 1800 = 5400

Hexagon =4 x 1800 = 7200 etc

**6/25 Parts of a circle**

* The circumference is the distance all the way around a circle.
* The diameter is the distance right across the middle of the circle, passing through the centre.
* The radius is the distance halfway across the circle.
* The radius is always half the length of the diameter. (d = 2 x r) or (r = ½ x d)

****

**6/26 Angles and straight lines**

* Angles on a straight line add up to 1800

 1480  320

**1480 + 320 = 1800**

* Angles about a point add up to 3600

1460

 1240

**1460 + 900 + 1240 = 3600**

* Vertically opposite angles are equal

 **1460**

 **340****340**

 **1460**

**6/27 Position on a co-ordinate grid**



**6/28 Transformations**

* **Translation -**A shape moved along a line

Example – Move shape A 3 right & 4 down

 Can also be written as a vector 3 Right

 -4 Down

****

B

A

Notice:

* The new shape stays the same way up
* The new shape is the same size
* **Reflect a shape in x-axis**

****

* **Reflect a shape in y-axis**

****

**6/29 Graphs**

* **Pie chart**

|  |  |  |
| --- | --- | --- |
| Transport | Frequency | Angle |
| Car | 13 | 13 x 9=1170 |
| Bus | 4 | 4 x 9=360 |
| Walk | 15 | 15 x 9=135 |
| Cycle | 8 | 8 x 9=72 |

 Total frequency = 40

 3600 ÷ 40 = 90 per person

* **Line graph**

Line graphs show changes in a single variable – in this graph changes in temperature can be observed.

****

**6/30 The mean**

The mean is usually known as the average.

The mean is not a value from the original list.

It is a typical value of a set of data

Mean = total of measures ÷ no. of measures

e.g.- Find mean speed of 6 cars travelling on a road

Car 1 – 66mph

Car 2 – 57mph

Car 3 – 71mph

Car 4 – 54mph

Car 5 – 69mph

Car 6 – 58mph

Mean = 66+57+71+54+69+58

 6

 = 375

 6

 = 62.5mph

Mean average speed was 62.5mph