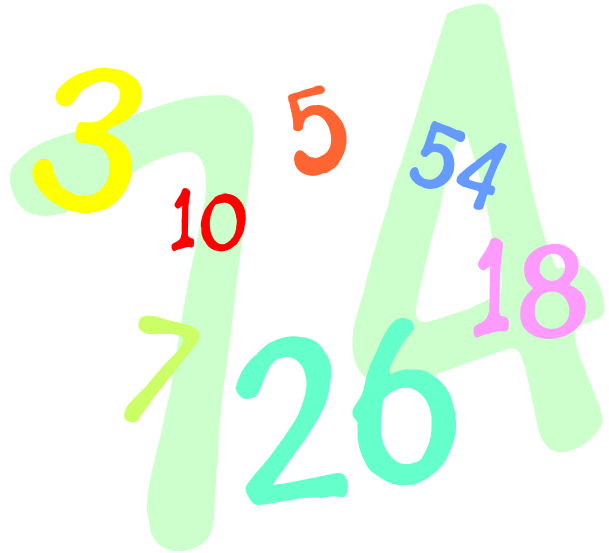
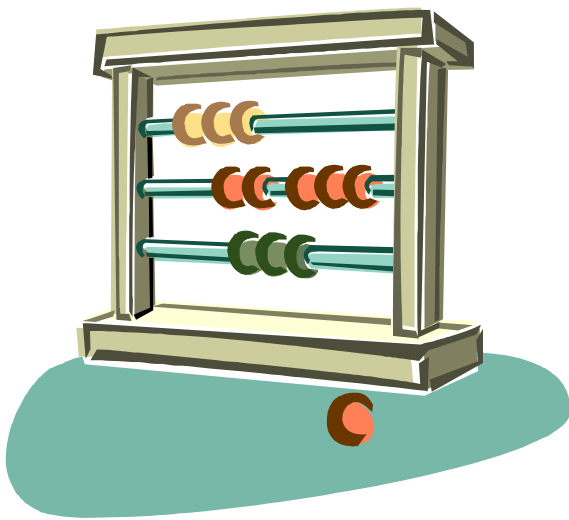


# Numeracy Booklet



**North Berwick High School**

**August 2011**

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# ROUNDING

## Rounding whole numbers - level 2

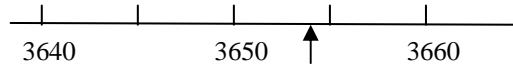
Round:

36**5**4 to the nearest 10

↑  
If the next digit is 5 or above we round up

36**5**4 to the nearest 10 is 3650

↑



3654 is between 3650 and 3660 - it is closer to 3650

36**5**4 to the nearest 100 is 3700

↑

3**6**54 to the nearest 1000 is 4000

↑

## Rounding decimals

### Rounding to decimal places

This is the 2nd decimal number

0.1**2**84

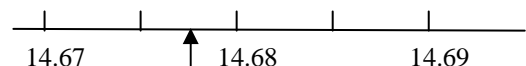
This is the 3rd decimal number

14.6**7**8 to 1 decimal place is 14.7

↑

14.67**8** to 2 decimal places is 14.68

↑



14.678 is between 14.67 and 14.68 - it is closer to 14.68

27.6**4**8 to 1 decimal place is 27.6

↑

15.39**7** to 2 decimal places is 15.40 the zero must be included here

↑

## Rounding using significant figures

## Level 3

2456 to 2 significant figures is 2500

↑

34 600 to 1 significant figure is 30 000

↑

0.00268 to 2 significant figures is 0.0027

↑

0.00097 to 1 significant figure is 0.001

↑

0.00097 to 2 significant figures is 0.0010

## ADDITION

## Level 2 onwards

Related words : Sum, total, plus

### Mental methods

To find  $36 + 45$

**Method 1** add the tens and add the units

$$30 + 40 = 70 \quad 6 + 5 = 11 \rightarrow 70 + 11 = 81 \quad \text{so } 36 + 45 = 81$$

**Method 2** add the tens then add the units

$$36 + 40 = 76 \quad 76 + 5 = 81 \quad \text{so } 36 + 45 = 81$$

**Method 3** add the next ten then subtract (in this case add 50 then subtract 5)

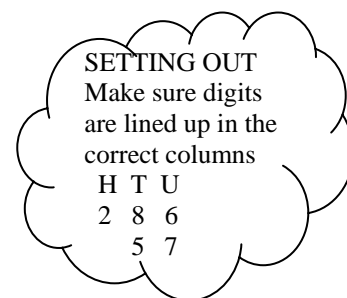
$$36 + 50 = 86 \quad 86 - 5 = 81 \quad \text{so } 36 + 45 = 81$$

## Written method

**Example 1** Find  $286 + 57$

Estimate:  $290 + 60 = 350$

Calculate: Start from the right hand side



Add the units → add the tens → add the hundreds

$$\begin{array}{r} 285 \\ +57 \\ \hline 2 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 286 \\ +57 \\ \hline 42 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 286 \\ +57 \\ \hline 342 \\ \hline 11 \end{array}$$



ESTIMATE your  
answer as a check

**Example 2** Find  $46.2 + 85.75$

Estimate:  $50 + 90 = 140$

Calculate:

$$\begin{array}{r} 46.20 \\ +85.75 \\ \hline 131.95 \\ \hline 1 \end{array}$$

Make the number of decimal  
places the same by adding a zero.

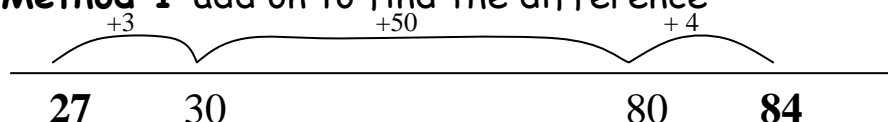
# SUBTRACTION      Level 2 onwards

Related words: difference, take away, minus

## Mental methods

Find  $84 - 27$

**Method 1** add on to find the difference



$$3 + 50 + 4 = 57$$

so  $84 - 27 = 57$

### Method 2

subtract tens subtract units

$$\begin{aligned} 84 - 20 &= 64 \\ 64 - 7 &= 57 \end{aligned}$$

### Method 3

subtract tens then add units

$$\begin{aligned} 84 - 30 &= 54 \\ 54 + 3 &= 57 \end{aligned}$$

## Written method

We use the decomposition method never 'borrow and pay back'!

**Example 1** Find  $2360 - 529$

Estimate:  $2400 - 500 = 1900$

Calculate: Start from the right hand side

Subtract the units → Subtract the tens → Subtract the hundreds

The diagram shows the written subtraction of 529 from 2360 using decomposition. It starts with 2360 minus 529. An arrow points to the first step where the 60 is decomposed into 50 and 10, resulting in 2350 and 10. Another arrow points to the final result, 1831, where the 10 is further decomposed into 100 and 10, and the 100 is added to the 2300 to make 2400, which is then reduced to 1800 after subtracting 500.

9 cannot be subtracted from zero so we must change a ten for ten units.

5 cannot be subtracted from 3 so we must change a thousand for ten hundreds.

**Example 2** Find  $752.0 - 87.9$

Estimate:  $750 - 90 = 660$

Calculate:

$$\begin{array}{r} 6\overset{1}{1}\overset{1}{1}\overset{1}{1} \\ 752.0 \\ - 87.9 \\ \hline 675.1 \end{array}$$



## MULTIPLICATION Level 2 onwards

### Mental methods

Knowledge of tables is very important, these need to be learned.

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

Find  $58 \times 3$

**Method 1** multiply tens, multiply units.

$$\begin{array}{l} 50 \times 3 = 150 \\ 8 \times 3 = 24 \\ \text{adding gives } 58 \times 3 = 174 \end{array}$$

**Method 2** multiply next ten then subtract

$$\begin{array}{l} 60 \times 3 = 180 \\ 2 \times 3 = 6 \\ \text{subtract } 58 \times 3 = 174 \end{array}$$

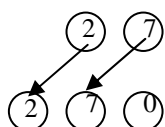
## Multiplying by 10,100...

When multiplying by 10 each **digit** is moved up one place to the left

When multiplying by 100 each **digit** is moved up two place to the left...

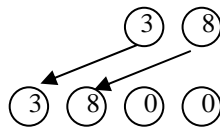
$$27 \times 10 = 270$$

Th H T U



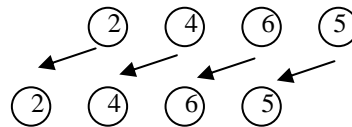
$$38 \times 100 = 3800$$

Th H T U



$$246.5 \times 10 = 2465$$

Th H T U • t



The decimal point does not move!

## Written method

### Example 1

Find  $742 \times 8$

Estimate:  $742 \times 10 = 7420$

Calculate: Work from the right hand side

Multiply units  $\rightarrow$  multiply tens  $\rightarrow$  multiply hundreds

$$\begin{array}{r} 742 \\ \times 8 \\ \hline 6 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 742 \\ \times 8 \\ \hline 36 \\ \hline 3 \quad 1 \end{array}$$

$$\begin{array}{r} 742 \\ \times 8 \\ \hline 5936 \\ \hline 3 \quad 1 \end{array}$$

## Multiplying by multiples of 10, 100...

To multiply by 40 multiply by 4 then multiply by 10 and so on

To multiply by 400 multiply by 4 then multiply by 100 and so on

### Example 1

Find  $37 \times 40$

$$37 \times 4 = 148$$

$$148 \times 10 = 1\,480$$

so  $37 \times 40 = 1\,480$

### Example 2

Find  $45.7 \times 300$

$$45.7 \times 3 = 137.1$$

$$137.1 \times 100 = 13\,710$$

so  $45.7 \times 300 = 13\,710$



**Example 3**

$37 \times 28$

Method 1

$$\begin{array}{r}
 37 \\
 \times 28 \\
 \hline
 296 \quad (8 \times 37) \\
 740 \quad (20 \times 37) \\
 \hline
 1036
 \end{array}$$

Method 2 Grid method

	30	7	
20	600	140	
8	240	56	

$600 + 140 + 240 + 56 = 1036$

**Multiplying decimals**      level 2/3**Example**      Find  $32.5 \times 2.8$ Estimate     $33 \times 3 = 99$ 

Calculate

$$\begin{array}{r}
 325 \\
 \times 28 \\
 \hline
 2600 \\
 6500 \\
 \hline
 9100
 \end{array}$$

Both numbers have been multiplied by 10.  
 $10 \times 10 = 100$  so we divide the answer by 100.

$9100 \div 100 = 91$

 The number of decimal places in the answer will be the same as the total number of decimal places in the question.

# DIVISION

Related words : split, share, quotient

## Level 1

Repeated subtraction from small numbers introducing division more used as a mental method.

$$\begin{array}{r}
 65 \div 5 \\
 \underline{-50} \div 5 = 10 \\
 15 \\
 \underline{-15} \div 5 = 3 \quad \text{so } 65 \div 5 = 13 \\
 0
 \end{array}$$

## Level 2 onwards

### Example 1

Find  $126 \div 7$

$$\begin{array}{r}
 18 \\
 7 \overline{)126}
 \end{array}$$

### Example 2

Find  $62.1 \div 3$

$$\begin{array}{r}
 20.7 \\
 3 \overline{)62.1}
 \end{array}$$

Start dividing from the left hand side

### Example 3

Find  $86 \div 5$

$$\begin{array}{r}
 17.2 \\
 5 \overline{)86.0}
 \end{array}$$

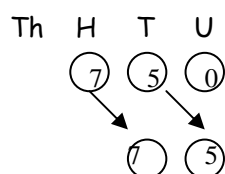
If there is a remainder at the end of the calculation add a decimal point and zeroes after the decimal point.

## Dividing by 10, 100...

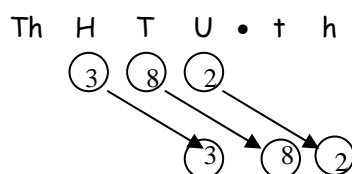
When dividing by 10 each digit is moved up one place to the left

When dividing by 100 each digit is moved up two places to the left...

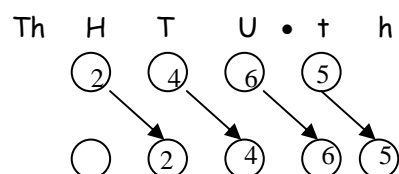
$$750 \div 10 = 75$$



$$382 \div 100 = 3.82$$



$$246.5 \div 10 = 24.65$$



**The decimal point does not move!**

## Dividing by multiples of 10, 100...

To divide by 40 divide by 4 then by 10 or by 10 then 4 and so on

To divide by 400 divide by 4 then by 100 or by 100 then 4 and so on

**Example 1** Find  $320 \div 40$

$$320 \div 10 = 32$$

$$32 \div 4 = 8$$

$$\text{so } 320 \div 40 = 8$$

**Example 2** Find  $60 \div 300$

$$60 \div 3 = 20$$

$$20 \div 100 = 0.2$$

## Dividing by a decimal

Find  $360 \div 0.3$

$$\frac{360}{0.3} \times 10 = \frac{3600}{3} = 1200$$

Multiply top and bottom by a multiple 10

## Level 3

## ORDER OF OPERATIONS Level 2/3

Would the calculation  $7 + 3 \times 5$  lead to the answer 50 or 22?

$$\begin{aligned} & 7 + 3 \times 5 \\ = & 7 + 15 \\ = & 22 \end{aligned}$$



When there is more than one operation involved in a calculation we have a specific order to carry them out. The order can be remembered by using the mnemonic **BODMAS**.

**(B)rackets**

**(O)f**

**(D)ivide**

**(M)ultiply**

**(A)dd**

**(S)ubtract**

Of equal importance

Of equal importance

### Level 2

#### Example 1

Find  $50 - 10 \div 2$

$$= 50 - 5$$

$$= 45$$

divide first

then subtract

#### Example 2

Find  $15 - 7 + 6$

$$= 8 + 6$$

$$= 14$$

add and subtract are of equal importance so work left to right

### Level 3

#### Example 3

Find  $(13 - 5) \times 7$

$$= 8 \times 7$$

$$= 56$$

bracket first

then multiply

## FORMULAE Level 2/3



When using a formula

- Write down the formula
- Replace the variables with the given numbers (this is called SUBSTITUTION)
- Solve the equation

### Example 1 Level 2

The formula for calculating the perimeter of a rectangle with length,  $l$  and breadth  $b$  is  $P = 2l + 2b$ .

Find the perimeter of a rectangle with length 20 centimetres and breadth 13 centimetres.

$$P = 2l + 2b \qquad l = 20\text{cm} , b = 13 \text{ cm}$$

$$P = 2 \times 20 + 2 \times 13$$

$$P = 40 + 26$$

$$P = 66$$

The perimeter is 66 cm.

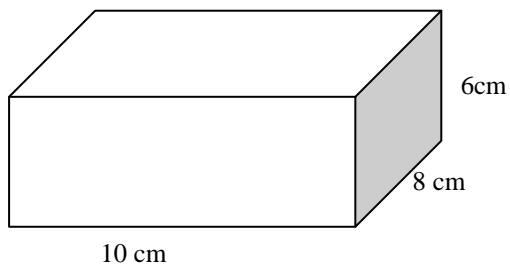
### Example 2 Level 3

Find the volume of this cuboid.

$$V = l \times b \times h$$

$$V = 10 \times 8 \times 6$$

$$V = 480 \text{ cm}^3$$





# TIME

## Things to remember

- 12 months in a year
- 30 days has September, April, June and November  
all the rest have 31 except February with 28 days clear and 29 in a leap year.
- 52 weeks in a year
- 365 days in a year
- 366 days in a leap year (the last two digits of a leap year are divisible by 4 or will be 00)

There are not 4 weeks in a month!



## Telling the time

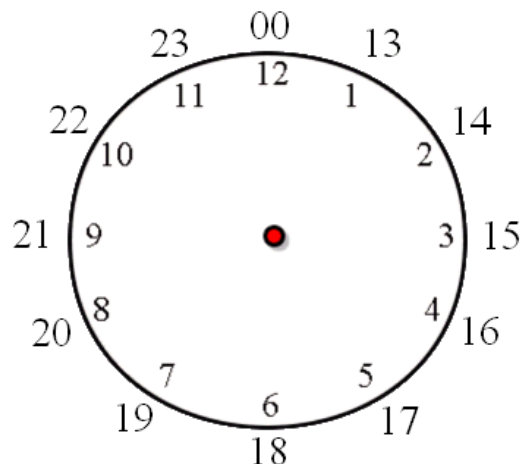
1 hour = 60 minutes

1 minute = 60 seconds



24h time doesn't need am/pm

12 hour	24 hour
10.20am	10:20
1.30pm	13:30
8.55pm	20:55



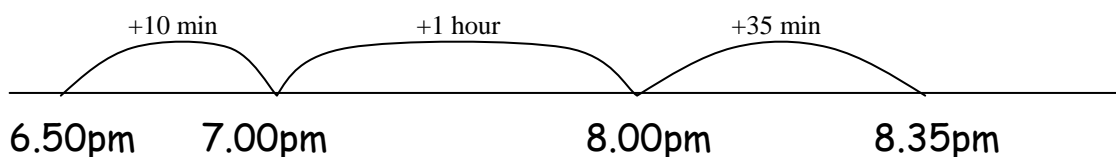
## Finding time intervals Level 2

The length of a time interval can be found by counting on.

### Example

A film starts at 6.50pm and ends at 8.35pm.

What is the length of the film.



Length of film = 10minutes + 1 hour + 35 minutes = 1 hour 45 minutes

Do not use subtraction.



## Converting time Level 2



To convert from minutes to hours divide by 60

To convert from hours to minutes multiply by 60

1 hour = 60 minutes  
0.1 hours = 6 minutes

Minutes	Hours
60	1
120	2
180	3

### Example 1

Convert 3.2 hours to minutes

$$3.2 \times 60 \\ = 192 \text{ minutes}$$

### Example 2

Convert 5h 18 minutes to hours

$$18 \text{ minutes} : 18 \div 60 = 0.3 \text{ hours} \\ 5 \text{ hours } 18 \text{ minutes} = 5.3 \text{ hours}$$

## Speed, distance and time level 2/3

We can use the following formulae to calculate information about a journey where the speed is constant.

$$D = S \times T$$

$$T = \frac{D}{S}$$

$$S = \frac{D}{T}$$

**Example** A car travels for 3 hours at an average speed of 60 miles per hour, how far did it travel?



$$D = S \times T$$

$$D = 60 \times 3$$

$$D = 180 \text{ miles}$$

**Example Level 3**

A car travels a distance of 180 kilometres at an average speed of 50 kilometres per hour. How long did the journey take?

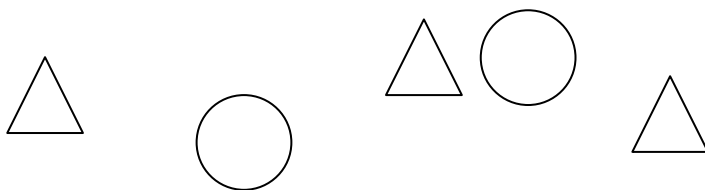
$$T = \frac{180}{50} = 3.6 \text{ hours} = 3 \text{ hours } 36 \text{ minutes}$$

Remember to divide by 50  
divide by 10 then by 5

Remember 0.1 hours = 6  
minutes



## FRACTIONS



What fraction of the shapes are circles?

There are 5 shapes. 2 out of 5 shapes are circles.

We can write this as a fraction.  $\frac{2}{5}$  of the shapes are circles.

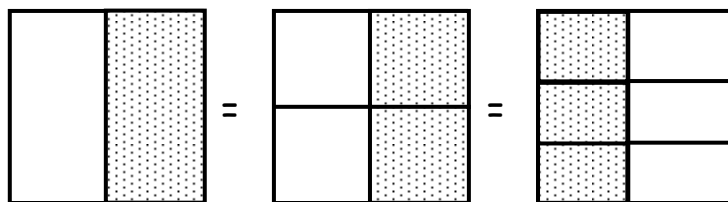
$$\frac{2}{5} \quad \frac{\text{The numerator}}{\text{The denominator}}$$

## Equivalent fractions Level 2

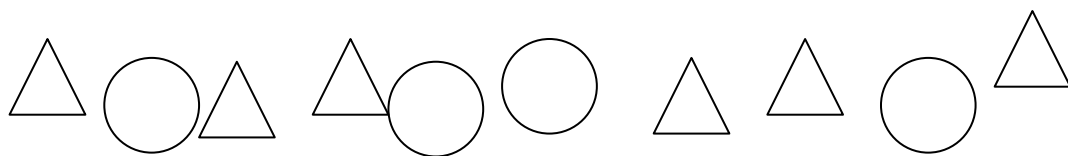
Fractions of the same value can be written in many different forms.

$$\frac{6}{10} \overset{\times 2}{=} \frac{3}{5}$$

$$\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8} \quad \frac{2}{3} = \frac{4}{6} = \frac{6}{9}$$



## Simplifying fractions Level 2



In the picture above  $\frac{6}{10}$  of the shapes are triangles.  
This fraction may be simplified.

$$\frac{6}{10} = \frac{3}{5}$$

$\div 2$  (above the line)  
 $\div 2$  (below the line)

To simplify a fraction divide the numerator and denominator by the same number.

## Finding a unit fraction Level 2

To find  $\frac{1}{2}$  divide by 2, to find  $\frac{1}{3}$  divide by 3, to find  $\frac{1}{8}$  divide by 8...  
Divide by the denominator.

Example

$$\frac{1}{6} \text{ of } 84 = 84 \div 6 = 14$$

## Finding a fraction Level 2

Example find  $\frac{3}{4}$  of £36

First find  $\frac{1}{4}$  of £36

$$\frac{1}{4} \text{ of } £36 = £36 \div 4 = 9$$

then find  $\frac{3}{4}$  of £36  
by multiplying  $\frac{1}{4}$  by 3

$$\frac{3}{4} \text{ of } £36 = £9 \times 3 = £27$$

# PERCENTAGES

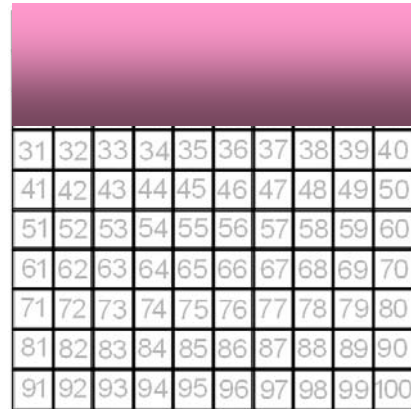
Percent means out of 100

$$17\% = \frac{17}{100} = 0.17$$

$$25\% = \frac{25}{100} \left( = \frac{1}{4} \right) = 0.25$$

$$8\% = \frac{8}{100} \left( = \frac{2}{25} \right) = 0.08$$

$$\text{amount shaded } 30\% = \frac{30}{100} \left( = \frac{3}{10} \right) = 0.3$$



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

Every percentage may be written as an equivalent fraction or decimal.

## Commonly used percentages

percentage	fraction	decimal
50%	$\frac{1}{2}$	0.5
25%	$\frac{1}{4}$	0.25
75%	$\frac{3}{4}$	0.75
10%	$\frac{1}{10}$	0.10
20%	$\frac{1}{5}$	0.20
1%	$\frac{1}{100}$	0.01
$33\frac{1}{3}\%$	$\frac{1}{3}$	$0.3\dot{3}$
$66\frac{2}{3}\%$	$\frac{2}{3}$	$0.6\dot{6}$
$12\frac{1}{2}\%$	$\frac{1}{8}$	0.125





## Finding a percentage without a calculator

Convert to equivalent fraction level 2/3

### Example 1

Find 25% of 60

25% of 60

$= \frac{1}{4}$  of 60

$= 60 \div 4$

$= 15$

### Example 2

Find  $33\frac{1}{3}\%$  of 17 100

$33\frac{1}{3}\%$  of 17 100

$= \frac{1}{3}$  of 17 100

$= 17\ 100 \div 3$

$= 5\ 700$

## Use multiples of 10% and 1%

### Example 1 Level 2/3

Find 70% of 240

10% of 240  $= \frac{1}{10}$  of 240 = 24

70% of 240  $= 24 \times 7 = 168$

### Example 2 Level 3

Find 37% of £80

10% of £80 = £8

so 30% of £80  $= 3 \times £8$   
 $= £24$

1% of £80 = £0.80

so 7% of £80  $= 7 \times £0.80$   
 $= £5.60$

37% of £80  $= £24 + £5.60$   
 $= £29.60$

37% =  
30% + 7%



## Finding a percentage with a calculator Level 3

We do not use the percentage button on a calculator. We convert the percentage to a fraction or decimal.

### Example

Find 27% of £108

method 1

27% of £108

$$= 0.27 \times 108$$

$$= \text{£}29.16$$

method 2


27% of £108

$$= \frac{27}{100} \text{ of } 108$$

$$= 27 \div 100 \times 108$$

$$= \text{£}29.16$$

## Expressing an amount as a percentage Level 2/3

 To express an amount as a percentage of a total, first write it as a fraction of the total.

### Example

There were 14 adults and 6 children in a doctor's waiting room. What percentage were children?

$$\text{Total number of people} = 6 + 14 = 20$$

$$\text{Fraction of children} = \frac{6}{20} = \frac{3}{10}$$

$$\text{Percentage of children} = 30\%$$



### Calculator method

Roy scored 16 /30 in his French test. Calculate this as a percentage to the nearest 1%

$$\frac{16}{30} = 16 \div 30 = 0.53333 = 53\%$$

## Increasing /decreasing by a percentage      Level 3

### Example 1

The value of a house was £150 000. Over the next year the value increased by 18%

Method 1   Level 3

18% of £150 000 = £27 000 increase

£150 000 + £27 000 = £177 000

Method 2   Level 3/4

calculator



100% + 18% = 118%

118% of £150 000

=  $1.18 \times$  £150 000

= £177 000

### Example 2

Decrease 315 metres by 7%

Method 1   Level 3

7% of 315 = 22.05 decrease

315 - 22.05 = 292.95 metres

Method 2   Level 3/4

calculator



100% - 7% = 93%

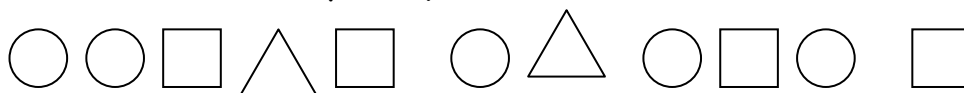
93% of 315 =  $0.93 \times$  315 = 292.95 metres

## RATIO

## Level 3



Ratios are used to compare quantities.



The ratio of :

circles:squares  
= 5 : 4

squares : circles  
= 4 : 5

triangles : squares  
= 2 : 4

This ratio may be simplified

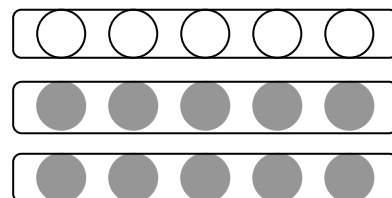
## Simplifying a ratio

The ratio of white counters to black counters is 5:10.

The counters may be grouped

So we have a ratio of 1:2.

This is called simplifying a ratio.



2: 6 simplifies to 1:3 ( $\div 2$  on both sides)

6: 15 simplifies to 2:5 ( $\div 3$  on both sides)

## Sharing in a given ratio

### Example

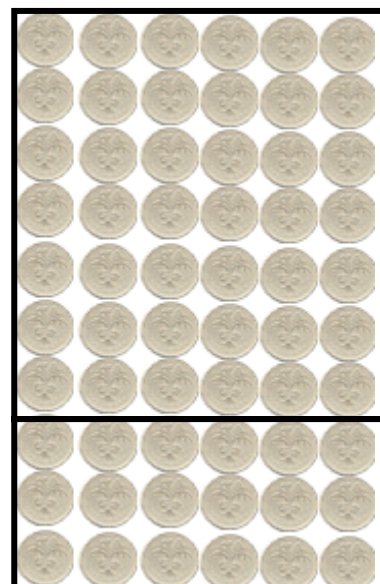
Share £60 in the ratio 7 : 3.

7 : 3 represents 7 parts to 3 parts. Total = 10 parts

Find 1 part       $£60 \div 10 = \underline{£6}$

7 parts =  $7 \times £6 = £42$

3 parts =  $3 \times £6 = £18$       £60 is shared into £42 and £18



## Using ratio

### Example

A rope is cut into two pieces in the ratio 2:5. If the shorter piece is 40 centimetres how long was the original rope?

$$2 \text{ parts} = 40 \text{ cm}$$

$$1 \text{ part} = 40 \text{ cm} \div 2 = 20 \text{ cm}$$

$$7 \text{ parts} = 20 \text{ cm} \times 7 = 140 \text{ cm}$$

You could  
also use a  
table

Parts	Rope (cm)
2	40
1	20
7	140

The original rope was 140 centimetres long.

## PROPORTION Level 3

 When two quantities are in proportion use a table to solve problems.

### Example 1

A box of 20 pens costs £3.50. How much would 80 pens cost?

pens	Cost (£)
20	3.50
80	14

80 pens cost £14

### Example 2

Eight tickets to the cinema cost £41.60. Find the cost of three tickets.

tickets	Cost (£)
8	41.60
1	5.20
3	15.60

Three tickets cost £15.60

This method is called the  
unitary method as we find one  
unit first.



# INFORMATION HANDLING

## Frequency tables

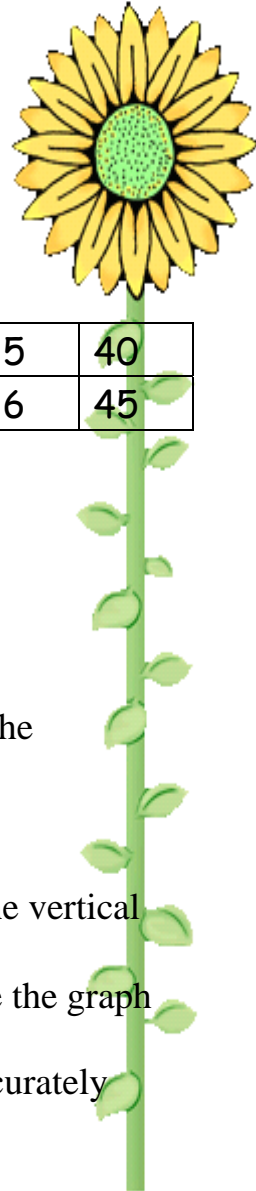
Data may be organised in a frequency table.

The number of absences in a class is counted each day for three weeks is counted.

4	1	1	1	2
1	0	0	1	1
1	2	0	2	2

The frequency is how often something occurs. Each occurrence is represented by a tally on the frequency table.

absences	tally	frequency
0		3
1	<del>    </del>	7
2		4
3		0
4		1

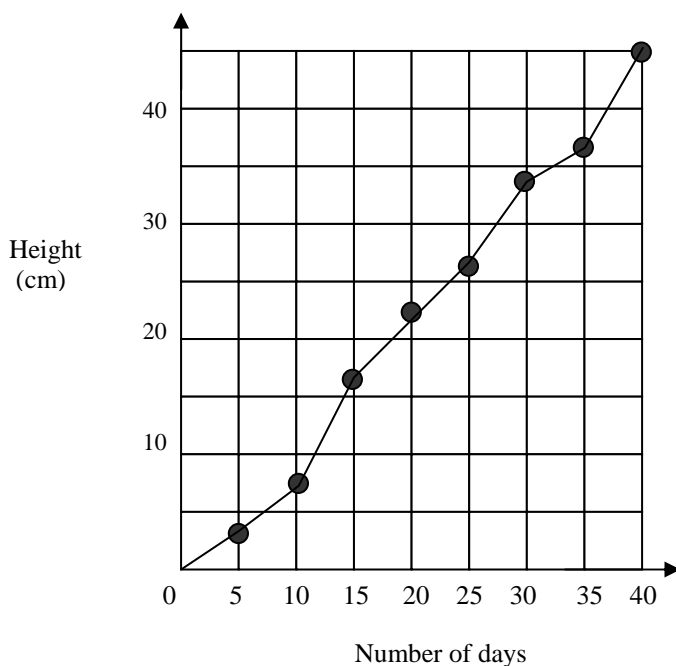


## LINE GRAPH

The height of a sunflower.

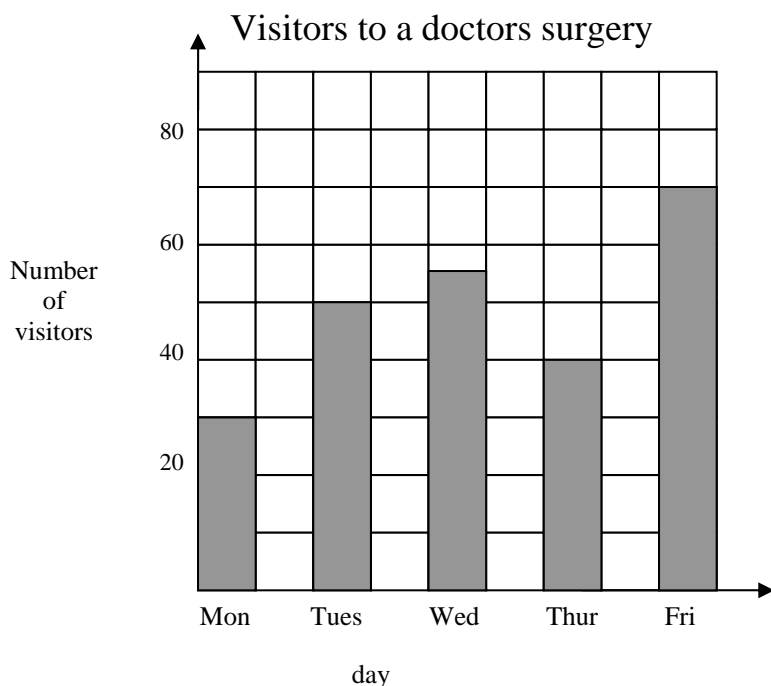
days	0	5	10	15	20	25	30	35	40
height	0	3	7.5	16	22	26	34	36	45

The height of a sunflower



- Top line of table is on the horizontal axis
- Choose a suitable scale
- Draw axes with a ruler
- Align the scales with the vertical lines not the boxes
- Label the axes and give the graph a title
- Plot data neatly and accurately

## Bar graph



- Choose a suitable scale
- Draw axes and bars with a ruler
- Write the vertical scale on the lines
- Align the labels on the horizontal axis with the bars
- Make bars the same width
- You may wish to leave a space between each bar
- Label the axes and give the graph a title
- Draw bars neatly and accurately

## Mean, mode and median Level 4 (not a numeracy outcome)



There are three measures of average.

Mean  $\frac{\text{Total of data}}{\text{Number of pieces of data}}$

Mode The most common piece of data.

Median Arrange data in order and find the middle of the data

The number of millimetres of rain measured over 8 weeks is given below.

15   5   7   0   5   1   3   4

Mean 
$$\frac{15 + 5 + 7 + 0 + 5 + 1 + 3 + 4}{8}$$
  

$$= \frac{40}{8} = 5$$

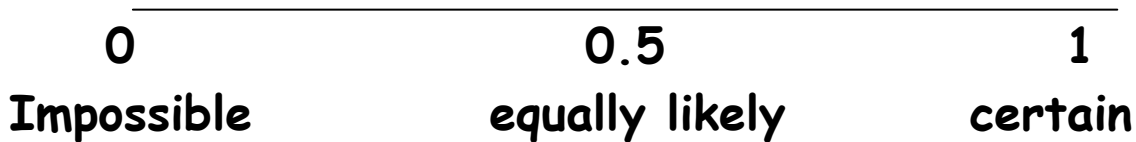
Mode The mode is 5

Median      0    1    3    4    5    5    7    15  
↑  
Median = 4.5

NOTE: If the number of pieces of data is odd the median will be a piece of data. If the number is even the median will be half way between two pieces of data.

# PROBABILITY

The probability or chance of an event happening can be measured on a scale from 0 to 1



We give probabilities as a fraction or decimal.

The probability of an event happening is given by

$$\text{probability} = \frac{\text{number of favourable outcomes}}{\text{total number of outcomes}}$$

## Example

There are 8 red counters and 5 blue counters in a bag. If one is chosen at random what is the probability it is red?

$$\text{Probability (red)} = \frac{8}{13}$$