

NUMERACY REVISION NOTES

SOME NUMERICAL FACTS

10mm	=	1cm	1000ml	=	1l	1000mg	=	1g
100cm	=	1m	1000cm ³	=	1l	1000g	=	1kg
1000m	=	1km				1000kg	=	1tonne
60secs	=	1min	1inch	=	2.5cm	One million = 1,000,000 (6 zeros)		
60mins	=	1hr	5miles	=	8km			
3600secs	=	1hr	2.2pounds	=	1kg			
			1 ³ / ₄ pints	=	1litre			

SQUARE NUMBERS AND SQUARE ROOTS

$$1^2 = 1 \times 1 = 1$$
$$2^2 = 2 \times 2 = 4$$
$$5^2 = 5 \times 5 = 25$$

$$\sqrt{25} = 5 \quad (\text{the square root of } 25 = 5 \text{ because } 5 \times 5 = 25)$$

CUBE NUMBERS AND CUBE ROOTS

$$1^3 = 1 \times 1 \times 1 = 1$$
$$2^3 = 2 \times 2 \times 2 = 8$$
$$5^3 = 5 \times 5 \times 5 = 125$$

$$\sqrt[3]{125} = 5 \quad (\text{the cube root of } 125 = 5 \text{ because } 5 \times 5 \times 5 = 125)$$

RECIPROCAL

The reciprocal of $\frac{3}{2} = \frac{2}{3}$

The reciprocal of 5 is $\frac{1}{5}$

Turn fraction upside down
5 can be written as first then turn upside down

BASIC DEFINITIONS

SUM (add -)

DIFFERENCE (subtract -)

PRODUCT (multiply x)

MULTIPLES

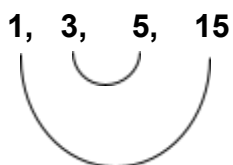
Multiples of 5 for example are the numbers in the 5 times table

e.g. 5, 10, 15, 20, 25,

FACTORS

Factors of a number go into it exactly leaving no remainder

e.g. factors of 15 are:



Notice that it is a good idea to list the factors in pairs – e.g.

$$1 \times 15 = 15 \text{ and } 3 \times 5 = 15$$

PRIME NUMBERS

2,3,5,7,11,13,17,19,23,29,..

A prime number has only two factors, 1 and itself

DIVISION

Work out $322 \div 14$

2 3

14

3 32 42

• 14 into 3 doesn't go so carry the 3 onto the next number

• 14 into 32 goes twice with 4 left over – carry this onto next number.

• 14 into 42 goes 3 times.

• Answer = 23

It helps to write the 14 times table!

$1 \times 14 = 14$

$2 \times 14 = 28$

$3 \times 14 = 42$

$4 \times 14 = 56$

$5 \times 14 = 70$

$6 \times 14 = 84$

$7 \times 14 = 98$

$8 \times 14 = 112$

$9 \times 14 = 126$

$10 \times 14 = 140$

ORDER OF OPERATION

B - bracket

I - indices

D - division

M - multiplication

A - addition

S - subtraction

$$\begin{aligned} & 5 + 3 \times 4 \\ = & 5 + 12 \\ = & 17 \end{aligned}$$

Do x before +

$$\begin{aligned} & 3 \times (5-2) \\ = & 3 \times 3 \\ = & 9 \end{aligned}$$

Do bracket before x

$$\begin{aligned} & 4 \times 3^2 \\ = & 4 \times 9 \\ = & 36 \end{aligned}$$

Do power before x

ROUNDING

Decimal Places

$$\begin{array}{l} 3.78 \text{ (1dp)} = 3.8 \\ 3.443 \text{ (2dp)} = 3.44 \end{array}$$

If the number after the line is 5 or more
– add 1 to the number before the line.

Significant Figures

$$\begin{array}{l} 31 \text{ (1sf)} = 30 \\ 475 \text{ (1sf)} = 480 \\ 387 \text{ (1sf)} = 400 \end{array}$$

31 has been rounded to the nearest 10
475 has been rounded to the nearest 10
387 has been rounded to the nearest 100

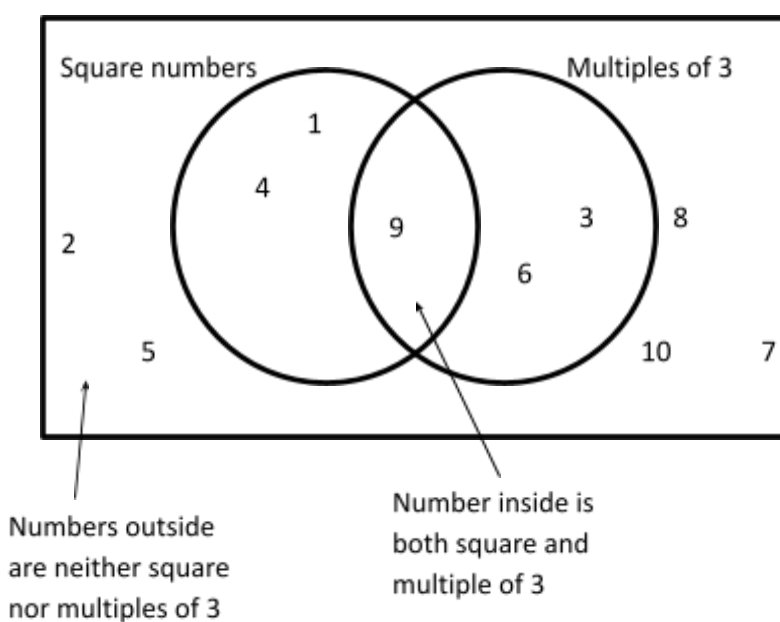
Estimation

Estimate the sum of £4.99, £6.02, £3.52

$$£5 + £6 + £3.50 = £14.50$$

VENN DIAGRAMS

Put the numbers 1 -10 into the Venn Diagram



FRACTIONS, DECIMALS AND PERCENTAGES

Simplifying Fractions

Simplify the following:

$$\frac{20}{25} = \frac{4}{5} \quad \begin{array}{c} \text{Divide top and bottom by 5} \\ \text{Divide top and bottom by 6} \end{array} \quad \frac{12}{18} = \frac{2}{3}$$

Mixed Numbers and Improper Fractions

$$2\frac{3}{4} = \frac{11}{4} \quad \boxed{2 \times 4 + 3 = 11}$$

Adding and Subtracting Fractions

$$\begin{aligned} & \frac{2}{3} + \frac{1}{4} \\ = & \frac{8}{12} + \frac{3}{12} \\ = & \frac{11}{12} \end{aligned}$$

We can't add fractions unless the denominator is the same – choose 12 because it is in the 3 and 4 times tables.

If we wanted to subtract the answer would be

Common Fraction, Decimal and Percentage Equivalents

The following table contains commonly used fraction, decimal and percentage equivalents – they need to be learned.

Fraction	Decimal	Percentage
$\frac{1}{2}$	0.5	50%
$\frac{1}{4}$	0.25	25%
$\frac{1}{8}$	0.125	12.5%
$\frac{3}{4}$	0.75	75%
$\frac{1}{3}$	0. $\dot{3}$	33. $\dot{3}$ %
$\frac{2}{3}$	0. $\dot{6}$	66. $\dot{6}$ %
$\frac{1}{10}$	0.1	10%
$\frac{1}{5}$	0.2	20%

Fractions of Quantities

Find $\frac{3}{4}$ of 24

$$= 24 \div 4 \times 3$$

$$= 18$$

Divide by the bottom and **T**imes by the **T**op

Percentages of Quantities

Examples

$$10\% \text{ of } 350 = 35$$

$$1\% \text{ of } 350 = 3.5$$

$$10\% \text{ of } 47 = 4.7$$

$$15\% \text{ of } 420$$

$$10\%$$

For $10\% \div 10$,

For $1\% \div 100$

$$5\% = 21$$

$$15\% = 42 + 21 = 63$$

Increase 320 by 20%

$$10\% = 32$$

$$20\% = 64$$

$$320 + 64 = 384$$

Increase means add on
decrease means subtract

COMPARING FRACTIONS DECIMALS AND PERCENTAGES

We may be asked to compare using the symbols ">", "<" or "="

$\frac{2}{5} = 40\%$ so
45% is bigger

$$45\% > \frac{2}{5}$$

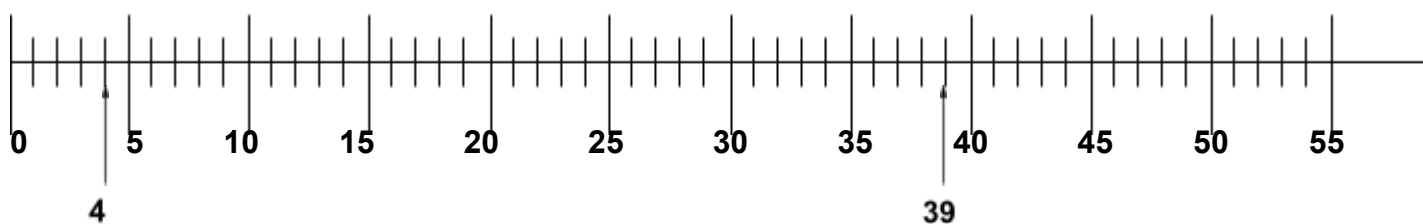
or

$$\frac{1}{4} < 0.26$$

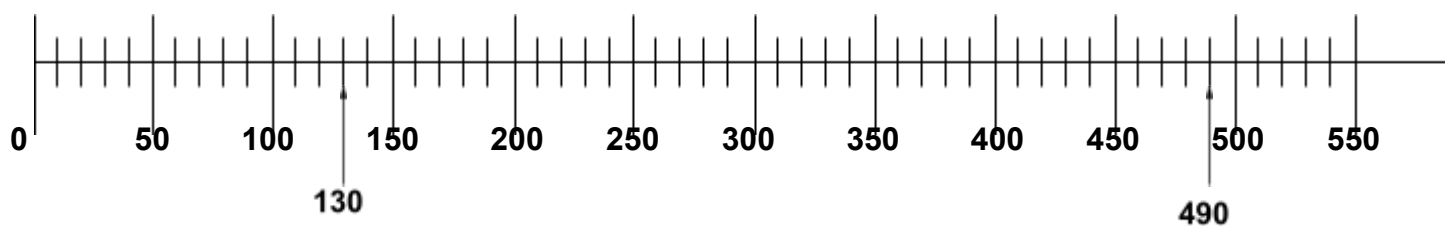
$\frac{1}{4} = 25\%$,
 $0.26 = 26\%$ so
26% is bigger

READING SCALES

1) This scale is going up in 1



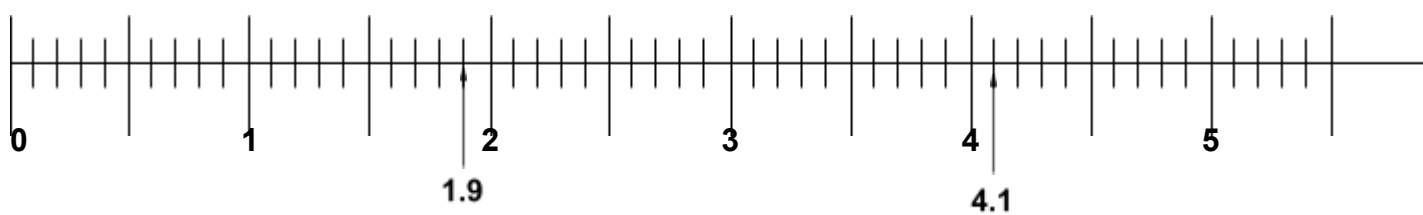
2) This scale is going up in 10



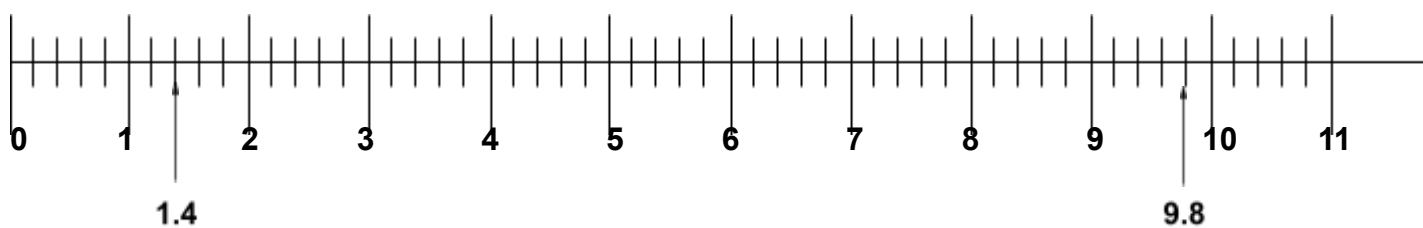
3) This scale is going up in 5



4) This scale is going up in 0.1



5) This scale is going up in 0.2



RATIO

Method 1

Ann : Bill

$$\begin{aligned} &= 2 : 7 \\ &= ? : 35 \end{aligned} \quad \begin{array}{c} \downarrow \\ \times 5 \end{array}$$

So Ann has 10 pencils

$$7 \times 5 = 35 \text{ so } 2 \times 5 = 10$$

Method 2

Ann and Bill share pencils in the ratio 2:7. If Bill has 35 pencils, how many does Ann have?

$$7 \text{ parts} = 35$$

$$1 \text{ part} = 5 \quad (35 \div 7)$$

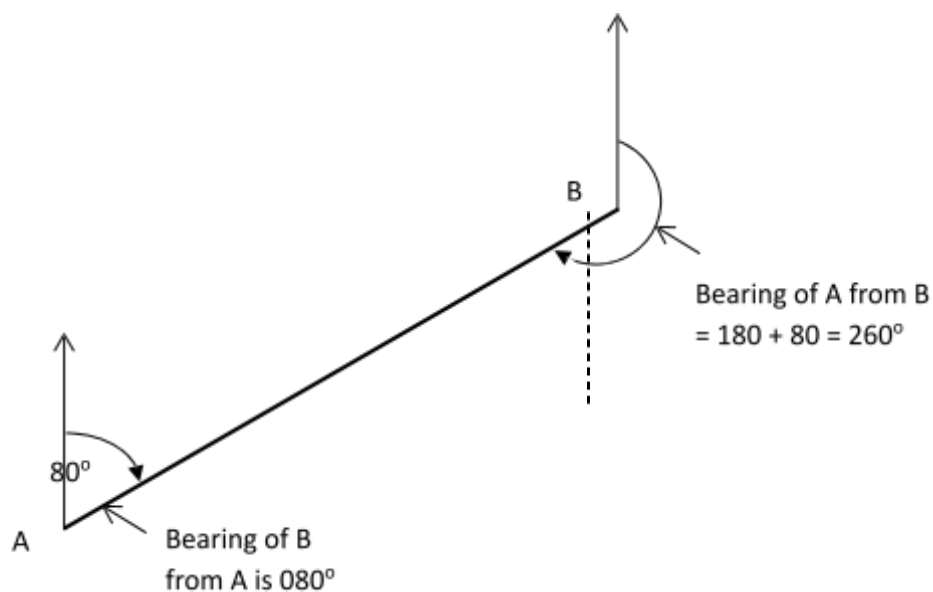
$$2 \text{ parts} = 10$$

Ann has 10 pencils

BEARINGS

A bearing of one point from another is the **angle from north** you have to turn in a **clockwise direction** from the first point to face the second point.

Bearings have to have three figures so for example a bearing of 87° needs to be written as **087°**

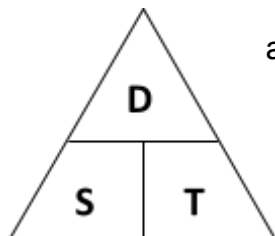


COMPOUND MEASURES

Speed – Distance - Time

$$\text{SPEED} = \frac{\text{DISTANCE}}{\text{TIME}}$$

It is worth remembering



and use the “cover up” method.

COVER "D", $D = S \times T$
COVER "S", $S = \frac{D}{T}$
COVER "T", $T = \frac{D}{S}$

Examples

1. A car travels at 30mph for 2hrs 30 mins – how far does it travel?

$$\begin{aligned}\text{Distance} &= \text{Speed} \times \text{Time} \\ &= 30 \times 2.5 \\ &= 75 \text{ miles}\end{aligned}$$

An easy mistake to make is that 2 hrs 30 mins = 2.3

Remember 2hrs 30 = 2 ½ hrs = 2.5

2. An ant travels 150 metres in 1.5 mins. What is its speed in metres per minute?

$$\begin{aligned}\text{Speed} &= \frac{\text{Distance}}{\text{Time}} \\ &= \frac{150}{1.5} \\ &= 100 \text{ metres / min}\end{aligned}$$

AREA

The **AREA** of a shape is the amount of space taken up inside the shape.

Note: The units of the answer will be squared. e.g. **cm² mm²** etc

Examples



5cm

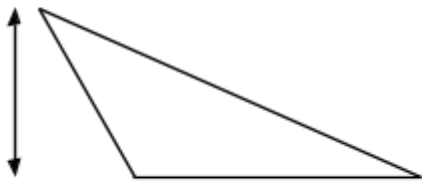
4cm

Rectangle

Area = length $\times$ width

Area = 5 $\times$ 4

= 20 cm²



6 mm

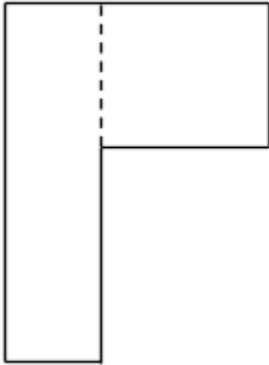
Triangle

3 mm

Area = $\frac{6 \times 3}{2}$

$$= \frac{18}{2}$$
$$= 9 \text{ mm}^2$$

$$\text{Area} = \frac{\text{base} \times \text{perpendicular height}}{2}$$



$$\text{Area} = X + Y$$

$$\begin{aligned} &= (12 \times 3) + (5 \times 7) \\ &= 36 + 35 \\ &= 71 \text{ m}^2 \end{aligned}$$



10 m

X

Y

12 m

7 m

3 m

CIRCUMFERENCE & AREA OF CIRCLES

FOR ANY CIRCLE, the circumference is equal to just over 3 times the length of its diameter.

This value is called "Pi" (Greek symbol π) where $\pi = 3.14$ (159265358979323846..)

For the purposes of examinations, we usually use ...



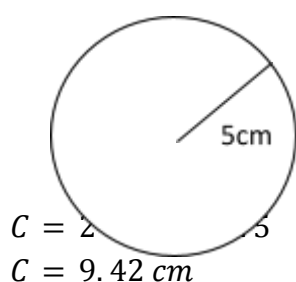
Circumference



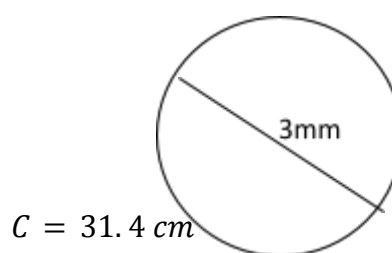
Some people prefer to use π but the following examples show use of 3.14.

Examples

Find the circumference of the following circles



$$\begin{aligned} C &= 2\pi r \\ C &= 2 \times 3.14 \times 5 \end{aligned}$$



diameter = 3mm,
so, radius = 1.5mm

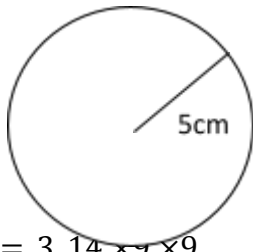
$$C = 2\pi r$$

$$C = 31.4 \text{ cm}$$

Area

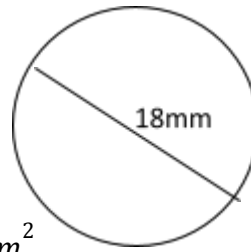


Find the area of the following circles



$$A = 3.14 \times 5 \times 5$$
$$A = 254.34 \text{ mm}^2$$

$$A = \pi r^2$$
$$A = 3.14 \times 5 \times 5$$



$$A = 78.5 \text{ cm}^2$$

diameter = 18mm,
so, radius = 9mm

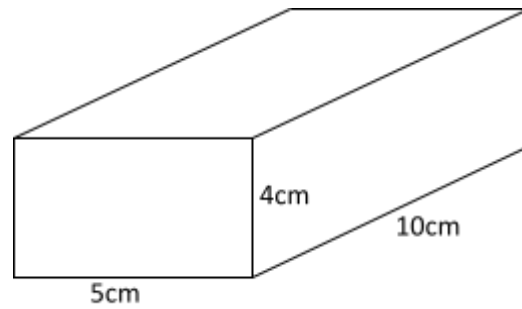
$$A = \pi r^2$$

VOLUME

Example

Find the volume of the following prism:

$$\begin{aligned}\text{Volume} &= L \times W \times H \\ &= 10 \times 5 \times 4 \\ &= 200 \text{ cm}^3\end{aligned}$$



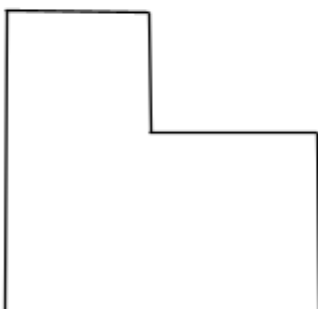
Notice units are cubed – i.e. the power is 3

PERIMETER

The **PERIMETER** of a shape is the total distance around its edge.

Note: The units of the answer will be the same as the ones used for each of the edges.

Examples



6cm

3cm

$$\text{Perimeter} = 6 + 6 + 3 + 3$$

$$= 18 \text{ cm}$$

5 cm

8 cm

7 cm

4cm

Perimeter = $7 + 8 + 4 + 5 + 3 + 3$

= 30 cm

MEAN, MEDIAN, MODE AND RANGE

MODE

The mode is the number that occurs the MOST often in a list.

2, 3, 5, 6, 2, 3, 7, 8, 6, 3

The mode is 3

MEDIAN

The median is the middle number in a list of numbers that has been put in order from the smallest to the biggest. Sometimes there will be two middle numbers (if we have an even amount in the list). If this happens we have to find the mean of the two middle ones (add the middle ones up and divide by 2).

1) 2, 7, 8, 3, 4, 6, 3 Put them in order first

2, 3, 3, 4, 6, 7, 8 The median is 4

2) 5, 7, 3, 2, 5, 9, 10, 15

In order,

2, 3, 5, 5, 7, 9, 10, 15 $5 + 7 = 12$, $12 \div 2 = 6$

The median = 6

MEAN

To find the mean from a list of numbers we need to add them up to get a total and then divide the total by how many numbers in the list.

If we have 12, 6, 17, 5, 10

Total = $12 + 6 + 17 + 5 + 10$
= 50

Mean = $50 \div 5$
= 10

RANGE

To find the range of a list of numbers, we take the smallest from the biggest.

3, 14, 21, 2, 6, 73

Range = $73 - 2$
= 71