

S2 Mathematics Level F Course

multiply EVERY term to get rid of fractional term. and Apply 'Balancing Method'

Multiply EVERY term by 3

$$\frac{x+1}{3} + 4 = 6 \quad (x+1) + 12 = 18$$

Subtract 13 from each side

$$x + 13 = 18$$

$$x = 5$$

The Circle

Circumference $C = \pi D$

Area is $A = \pi r^2$

Diameter $D = 2r$

Radius $r = \frac{1}{2}D$

Pythagoras Theorem

Two key points when dealing with right-angled triangles

The longest side in a right-angled triangle is called The HYPOTENUSE

The HYPOTENUSE is ALWAYS opposite the right angle

$$c^2 = a^2 + b^2$$

$$(xz)^2 = (xy)^2 + (yz)^2$$

Area

Revision of Square, Rectangle and RAT.

$A = l^2$ $A = l \times b$ $A = \frac{1}{2}bh$

Any Type of Triangle $A = \frac{1}{2}bh$

Rhombus and kite $A = \frac{1}{2}Dd$

Parallelogram $A = bh$

Trapezium $A = \frac{1}{2}(a+b)h$

Percentages

e.g. 17.5% of 300

10% $\rightarrow 300 \div 10 = \pounds 30$
 5% $\rightarrow 30 \div 2 = \pounds 15$
 2.5% $\rightarrow 15 \div 2 = \pounds 7.50$
 17.5% $\rightarrow \pounds 52.50$

Without a calculator

With a calculator

Percentage out of 100

Finding Percentages

10% $\rightarrow +10$
 5% \rightarrow half of 10%
 1% $\rightarrow +100$
 0.5% \rightarrow half of 1%
 2% \rightarrow twice 1%
 3% \rightarrow 3 times 1%

% profit or loss

I buy a CD for $\pounds 4$ and sell it for $\pounds 7$.
 What is the percentage profit?
 Profit made $\pounds 3$ $\frac{3}{4} \times 100 = 75\%$

e.g. 19% of $\pounds 60$
 $\frac{19}{100} \times 60 = \pounds 11.40$

Factorisation

Take any common factors out and put them outside the brackets.

$$4xy - 2x = 2x(2y - 1)$$

Proportion

5 cakes cost $\pounds 4$
 How much for 3 cakes?

cakes	cost
5	4
1	0.80
3	$\pounds 2.40$

Test for Direct

- Straight line through the origin (0,0)
- Ratio: $y \div x = k$ (constant number)

Direct proportion & Indirect Proportion

3 men build a wall in 8 hrs
 How long will 4 men take?

men	hours
3	8
1	24
4	6

Test for indirect

- $y \times x = k$ (constant number)

$y \times x = 8$
 $k = 8$

Linear Patterns

Number of Tables	1	2	3	4	5
Number of Surfers	5	7	9	11	13

Step 1: Find difference

Step 2: Part of the Formula $S = 2T$

Step 3: Correction factor "add on 2" $S = 2T + 3$

Same difference linear pattern

Find a number so formula works

Fractions

Adding $\frac{1}{2} + \frac{1}{3} = \frac{5}{6}$

Multiplication $\frac{1}{2} \times \frac{3}{5} = \frac{3}{10}$

Subtracting $\frac{2}{3} - \frac{1}{2} = \frac{1}{6}$

Division $\frac{1}{2} \div \frac{4}{5} = \frac{5}{8}$

Simple fractions

Basic Rules of Fraction

Harder fractions

Top-heavy $\frac{1}{2} \div \frac{1}{3} = \frac{3}{2}$

Division $\frac{3}{2} \div \frac{5}{4} = \frac{9}{5}$

Same idea for addition

Charts

Scattergraph

Strong positive correlation

Strong negative correlation

Best fit line

Ages

2	4	6	8			
3	0	1	3			
4	4	4	5	6	7	9
5	0	3	4	9		
6	1	4	5	6		

stem leaves

$n = 20$ Key: 2 | 4 means 24

Pie Chart

Chocolate 84°
 Banana 66°
 Vanilla 39°
 Strawberry 171°

Scale Drawings

Solution Using a scale of 1cm = 2m

- Draw line XY=3cm
- Draw a line straight up from Y.
- Measure angle 55° from X.
- Draw line from X to vertical line and mark T at crossover point.
- Measure length YT. 4.3cm
- Multiply length YT. by scale factor.
 $4.3 \times 2 = 8.6m$

Flag pole is 8.6m high

Scientific Notation

Why is this not scientific notation?

4000

Write out in full 4×10^3

$a \times 10^n$

a not between 1 and 10

11×10^{18}

1.1×10^{19}

a between 1 and 10

n is positive

LARGE numbers

Science

Maths

Standard Form

SMALL numbers

$a \times 10^n$

a between 1 and 10

n is negative

0.0000006

Write out in full 6×10^{-7}

0.5 $\times 10^{-5}$

5 $\times 10^{-6}$

Why is this not scientific notation?

a is less than 1

$a < 1$

Speed time Distance

$D = S \times T$

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

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

Simple way to remember the 3 formulae!

To change minutes to decimal hours 'divide minutes by 60'

To change decimal time to minutes 'multiply the decimal part by 60'

Statistics

An average should indicate a "measure of central tendency" but should also indicate what the distribution of data looks like.

This is why we have 3 different types of averages to consider

- The Mean
- The Median (put the data in order then find the MIDDLE value)
- The Mode (the number that appears the most)