

For balance we have

Subtract 6 from each side
 $5a + 6 = 3a + 16$
 $-6 \quad -6$
 $5a = 3a + 10$

Subtract 3a from each side
 $5a = 3a + 10$
 $-3a \quad -3a$
 $2a = 10$

Divide each side by 2
 $2a = 10$
 $a = 5$ ✓

Adult ticket price is £5

Algebra

$10x^2 - 6xy$
 HCF = $2x$
 divide each term by HCF $2x(5x - 3y)$

$x^2 + x + 3 + y + 9 - 2x - 4y$
 $= x^2 - x - 3y + 12$
 Note $x^2 \neq x$

Tidying up terms

Factorising

Removing single bracket

Evaluating Expressions
 $a = 2 \quad b = (-3) \quad c = 4$

BODMAS

$= 2b - 3(a - c)^2$
 $= 2(-3) - 3(2 - 4)^2$
 $= -6 - 12$
 $= -18$

$9 - 3(8 - y) = 9 - 24 + 3y$
 $= -15 + 3y$

Statistics 1

Favourite Sport

Rugby	75	Rugby angle = $\frac{75}{300} \times 360 = 90^\circ$
Football	90	Football angle = $\frac{90}{300} \times 360 = 108^\circ$
Cricket	45	Cricket angle = $\frac{45}{300} \times 360 = 54^\circ$
Ice Hockey	60	Ice Hockey angle = $\frac{60}{300} \times 360 = 72^\circ$
Squash	30	Squash angle = $\frac{30}{300} \times 360 = 36^\circ$
Total	300	

Statistics

Pie Chart

Probability

Scattergraph

Best fit line

Best fit line

Strong positive correlation

Strong negative correlation

There are 3 red and 4 green balls in a bag.
 What is the probability a green ball is picked?
 $P(\text{green}) = \frac{4}{3+4} = \frac{4}{7}$

Areas

Revision of Square, Rectangle and RAT.

Any Type of Triangle

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

Parallelogram $A = bh$

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

Solving Equations

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

2 2 2 2

Step 1: Find difference
 Same difference linear pattern

Step 2: Part of the Formula $S = 2T$
 Find a number so formula works

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

Linear Patterns

Algebra

S3 Mathematics General Course

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

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

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

Statistics 2

Mode: 37
 Range: 34
 Median: 22

Mean: Sum of data ÷ Number of data

Median: Middle value (ordered data)

Mode: Most common number

Range: Highest - Lowest

Remember KEY

Day	Freq. (f)	C.F. Total so far
1	2	2
2	3	5
3	1	6
4	6	12
5	5	17
6	8	25
7	4	29

Median from a Frequency table

Half of 29 is 14.5

Mean = $\frac{40}{16} = 2.5$

No of Coins (c)	Freq. (f)	f x C
1	5	5 x 1 = 5
2	5	5 x 2 = 10
3	1	1 x 3 = 3
4	3	3 x 4 = 12
5	2	2 x 5 = 10
Totals	16	40

Statistics 2

Fractions

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

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

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

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

Simple fractions

Basic Rules of Fraction

Harder fractions

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

Multiplication $1\frac{1}{2} \times 1\frac{3}{4} = 2\frac{15}{8}$

Division $1\frac{1}{2} \div 1\frac{2}{3} = \frac{3}{2} \div \frac{2}{3} = \frac{9}{4}$

Same idea for addition

Percentages

e.g. 17.5% of 300

10% ⇒ 300 ÷ 10 = £30

5% ⇒ 30 ÷ 2 = £15

2.5% ⇒ 15 ÷ 2 = £7.50

17.5% ⇒ £52.50

Without a calculator

With a calculator

Percentage out of 100

Finding Percentages

% profit or loss

e.g. 19% of £60

$\frac{19}{100} \times 60 = £11.40$

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

Trigonometry

Opposite

Adjacent

Hypotenuse

x°

Distance Speed Time

$D = S \times T$

A racing car travelled at 50 km/hr.
 What is the distance covered in 6 hours 30mins?
 $D = S \times T = 50 \times 6.5 = 325 \text{ km}$

How long did the bus journey take if it travelled a total distance of 60 km at an average speed of 40 km/hr.
 $T = \frac{D}{S} = \frac{60 \text{ km}}{40 \text{ km/hr}} = 1.5 \text{ hrs}$
 $T = 1 \text{ hr } 30 \text{ mins}$

Daniel drove from his house to the Blackpool, a distance of 135 miles. It took him 2hrs 15mins.
 What was his average speed?
 $S = \frac{D}{T} = \frac{135 \text{ miles}}{2\frac{1}{4} \text{ hrs}} = 2.25$
 $S = 60 \text{ mph}$

CAREFUL! Units MUST be consistent!!

If distance is in kilometres and time in hours then speed is in kilometres per hour

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

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

2hr 15 minutes to decimal is $2 + \frac{15}{60} = 2.25 \text{ hrs}$

3.7 hrs to hours and minutes is $3 + 0.7 \times 60 = 3 \text{ hrs } 42 \text{ mins}$

Converting Time

Distance Speed Time

Process

- Write down **(SOH)(CAH)(TOA)**
- Identify what you want to find
- what you know

$\sin x^\circ = \frac{\text{Opp}}{\text{Hyp}}$ $\cos x^\circ = \frac{\text{Adj}}{\text{Hyp}}$ $\tan x^\circ = \frac{\text{Opp}}{\text{Adj}}$

SOH CAH TOA