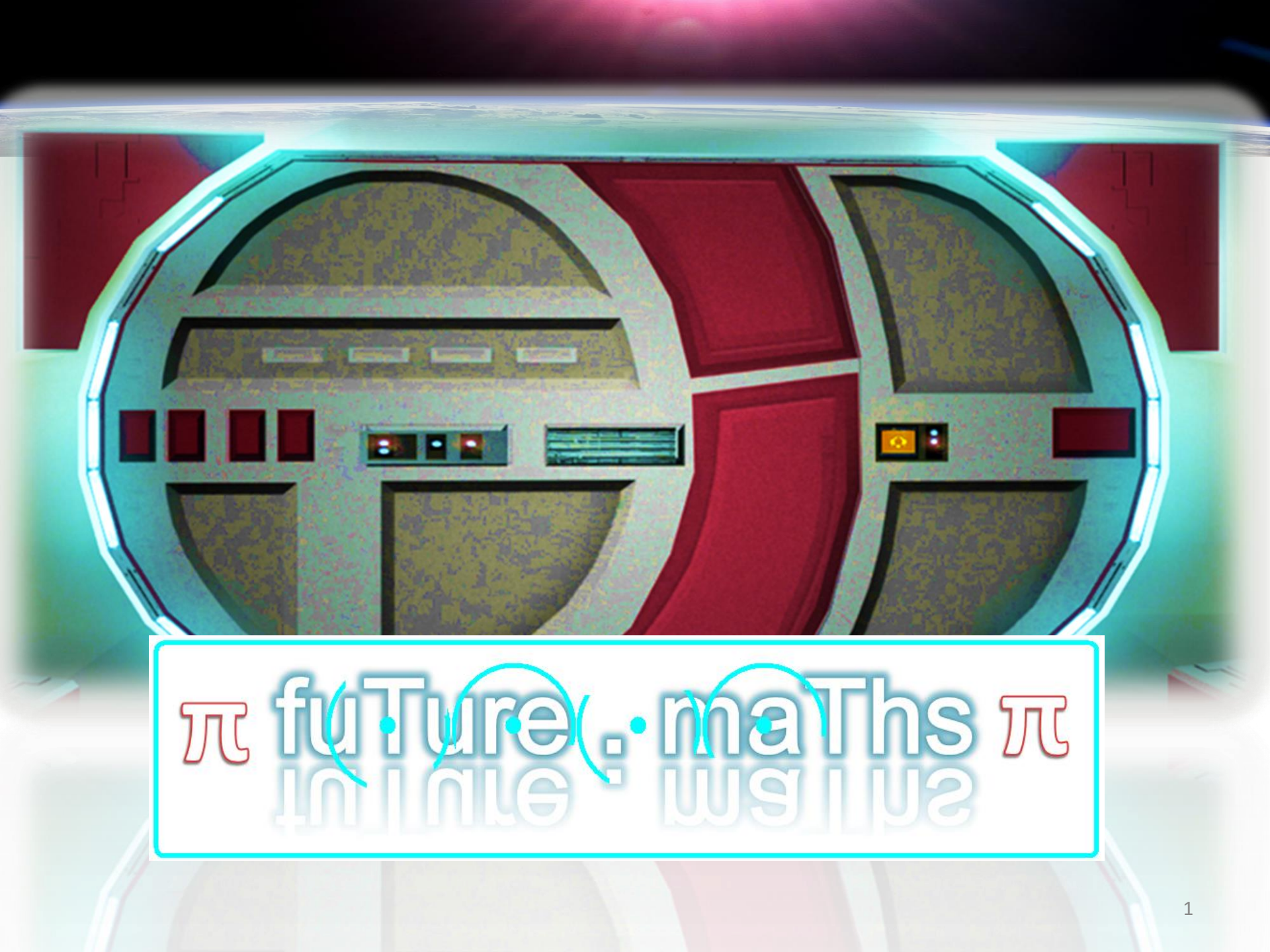

π fuTure . maThs π


π futuRe maTh π
π maTh E1 E2 E3 π
$3x^2=y$
π maTh Level 1 & 2 π

Course Content: Choose your topic …

MATHS L1 to L2

Whole Number and Functions

place value

negative numbers

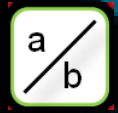

add and subtract


multiply divide

round numbers

ratio scale

Parts of a whole



fraction

decimal numbers


percent

percent decimal fraction

Measure and Shape

metric measure

imperial measure

perimeter

area

volume

formulae bodmas

Handling Data


charts data

averages


prob-ability

Topic Introduction : Formula

FORMULA

A formula is a set of instructions that you can follow such as a recipe or health and safety instructions. In maths formulas are written using letters of the alphabet and symbols. Numbers are often not used as we do not yet know their values. 'x's and 'y's are very often used as unknown quantities until we go and read off the value, measure them or find out how many, much or far!

Formulas can be manipulated and combined, simplified and altered. You will be dealing with simple formulas that are given to you in this topic, replacing letters with numbers and solving, however this is a very important topic in your maths studies if you are thinking of taking your studies higher. Concentrate hard and have fun ..!

Choose an icon to select where to start

Warm up Exercise 1

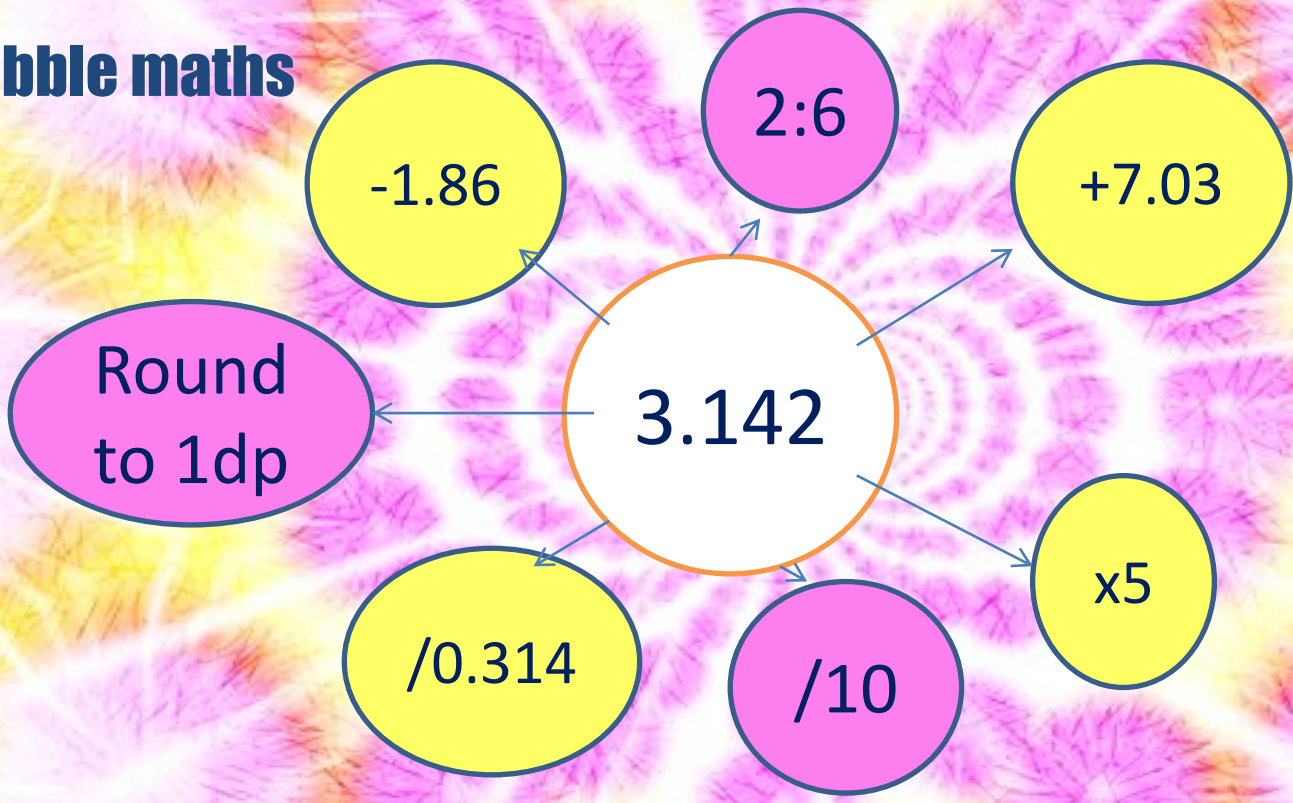
1 x 7 =	
2 x 7 =	
3 x 7 =	
4 x 7 =	
5 x 7 =	
6 x 7 =	
7 x 7 =	
8 x 7 =	
9 x 7 =	
10 x 7 =	

	1	7	3	10	6	4	8	5	9	2
6										
10										
8										
7										
3										
9										
4										
2										
5										

Lets start today by revising ! Complete the above sums and multiplication grid

Warm up Exercise 2

Bubble maths



Calculate the instruction on the central number

Warm up Exercise 3

77mm=	.....cm
8.9m	.....cm
0.71m	.....mm
90km	.....m
8m	.....km
45cm	.....m
348mm	.....m
29mm	.....cm
9ml	cl
16l	cl

0.31l	....ml
99cl	l
18ml	l
1450ml	cl
11g	.....mg
72kg	.....g
2g	..... kg
50mg	.....g

Progress Checker 1

What do you already know about Formulae?

How would you rate your skills in using formulae ?

1) Excellent ability
2) Good ability, but working to improve
3) Ok, making a start but I know I have lots to still learn

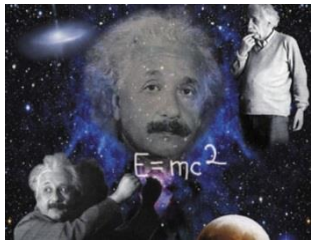
My aims for today are…

A State what a formula is and when they are useful
B Read and write formulae using letters and symbols
C Replace formulae unknown values with numbers and solve to find answers to problems

$$QT = k \times \sqrt{RR}$$

$$\frac{5t}{4} + 3 = 18$$

UVC Length (cm) = [1.5 x birthweight (kg)] + 5.5



Introductory Video and Discussion

Why do we write formulae and what uses do we have for them ?
How do you know what the letters in a formula mean ?

What does ' rearranging a formula ' mean ?
Are formulae the same as equations ?

How do you know what numbers to put into a formula ?
Does it matter what order you do the sums in a formula ?

Watch the introductory video and then discuss the above

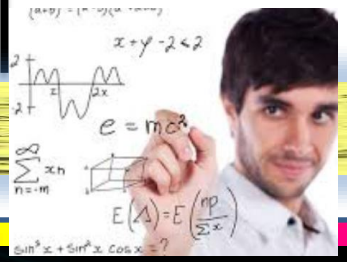
Your thoughts..

Vocabulary and Jobs

Formula
Rearrange
Simplify
Solve
Replace
Substitute
Unknown
Variable
Constant
Brackets
Factorise
Equation

Mathematicians
Scientists
Statisticians
Computer Programmers
Analysts
Government
Pension
Mortgage/Banks
Engineer
Cosmologist
…. Can you think of more?
……

These are the words you will be using in this topic




Lesson: Concept Activity

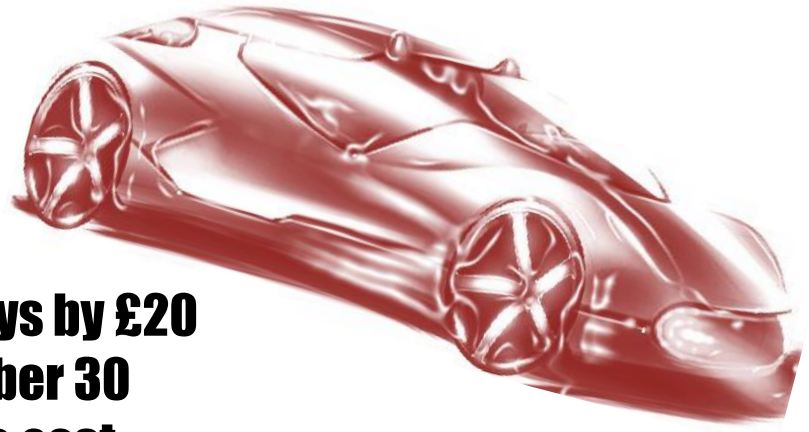
two L plus five is the same as b minus two	b plus two take away L equals five
L + 5 -2 = b	xy = 5 + 2
2L + 5 = b - 2	b + 2 - L = 5
v/4 = 18 - b	a quarter of v is eighteen minus b
five divided by L add b is two	seven lots of L times b minus five is v
5 / (L + b) = 2	L plus five minus two is b
x times y is seven	7 (Lb) - 5 = v

Match up the formulae with cards that describe what they mean.

1..... What are Formulae?

Formulae are a set of instructions telling you what to do with some numbers once you have them.

eg.. **£20 x d + £30 = C**



Here 'd' means days and 'C' means cost.

The formula says... times the number of days by £20
then add the number 30
this gives you the cost

This tells you what to do before you even know the number of days

This could be a formula for working out the cost of hiring a car for some days..

2..... Solving formulae

STEP 1

WRITE DOWN THE FORMULA eg... 8 L + G – 70 = X

STEP 2

PUT THE NUMBERS YOU KNOW INTO THE FORMULA eg when L = 3, and G = 5

8 (3) + 5 – 70 = X

STEP 3

SOLVE TO FIND THE VALUES YOU WANT eg...

8 x 3 + 5 – 70 =

24 + 5 – 70 =

29 – 70 = -41 = X

3..... Rearranging formulae

This is about swapping the letters and numbers around to different sides of the equals sign to let you find values in your formula

H=8e + 2, Make e the subject of the formulae

Lets see how we got H. . . in H=8e + 2

Start with e → Multiply all by 8 x8 → Add 2 +2 → We get H

Do the exact opposite to get e . .

Start with H → Subtract 2 -2 → Divide all by 8 ÷8 → We get e

So $e=(H-2)\div 8$ or $e=\frac{(H-2)}{8}$

Your turn: Make a the subject of the formula F=6a +5

3..... Rearranging formulae

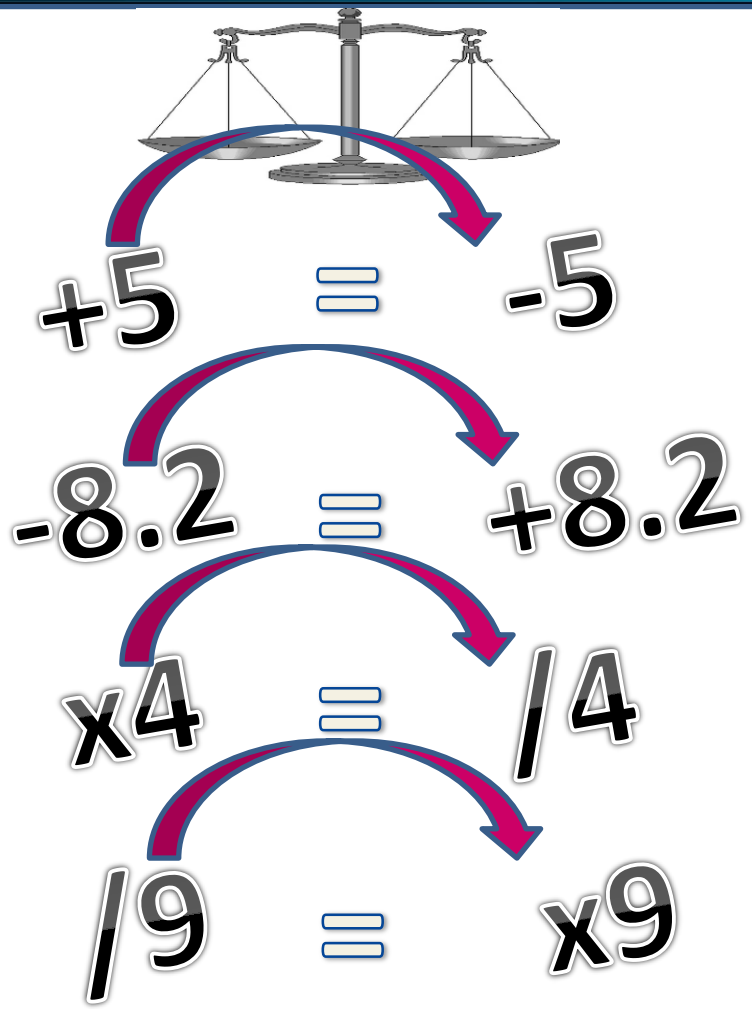
The reverse of adding is subtracting

The reverse of subtracting is adding

The reverse of multiplying is dividing

The reverse of dividing is multiplying

when moving numbers to the other side of an equals, you reverse the function



Lesson: Try out

Block 1 : Watch tutor led demo (in class or on video)

Try these, 1) If A + 3 = 10, find A 2) What is 'b' if 10 b = 90

3) 3C = 15, what is C ? 4) 9 / a = 7 – 4 what is ' a ' ?

Block 2 : Watch tutor led demo (in class or on video)

Try these, 5) 10 (X – 3) = 20, find X 6) 9/5 C + 32 = F when C = 10.. What is F ?

7) 6 W L = 1/3 B, when W = 1 and L = 2 what is B? 8) 0.5 (XY) = 7, X = 2, Y = ?

Block 3 : Watch tutor led demo (in class or on video)

Try these, 9) $2x^2 = 20$ 10) $E = \frac{1}{2} v C^2 + 8$ rearrange to make C the subject

11) 5 (T +7) / S = U make T the subject 12) 80 a c x = $\sqrt{b}$ make c the subject

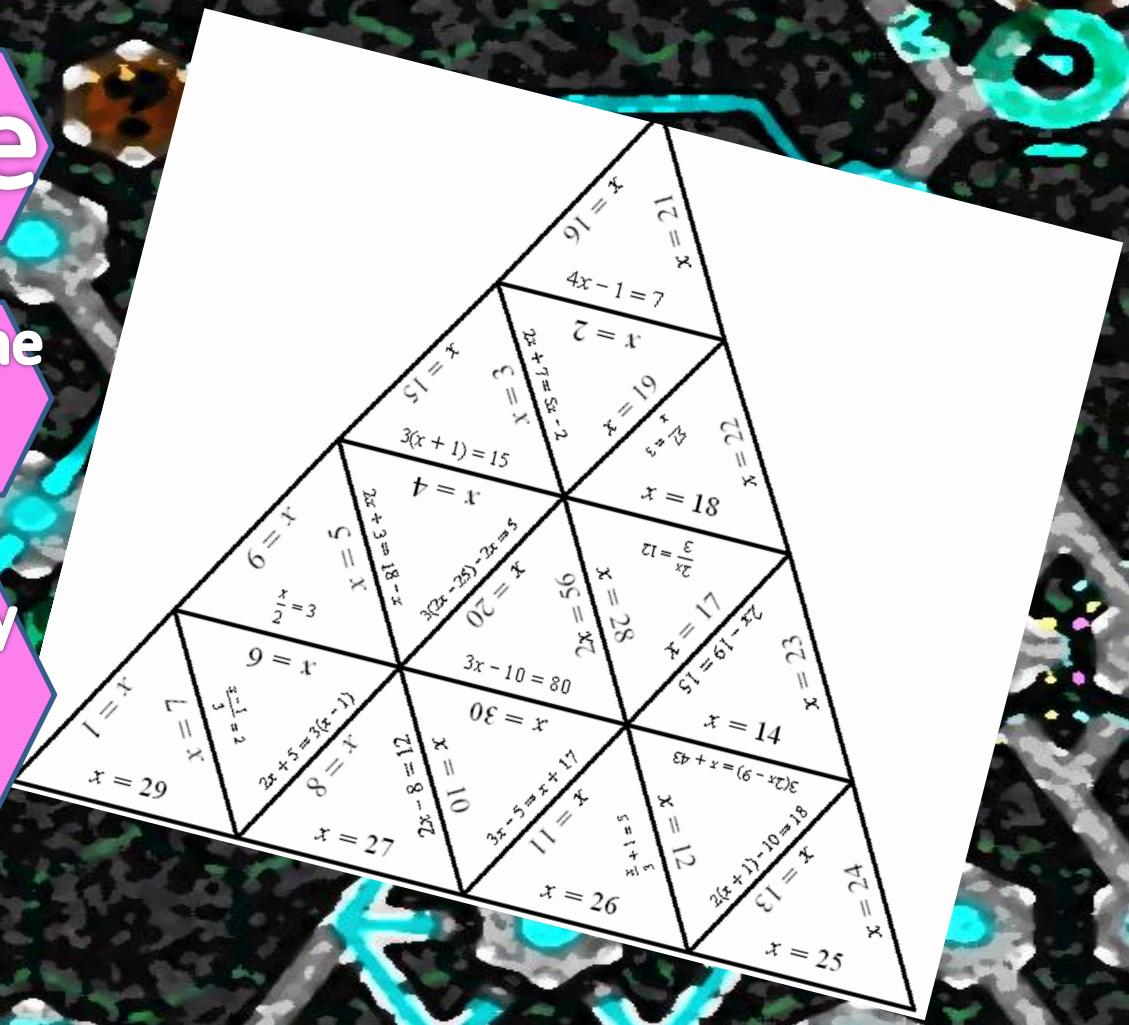
Lesson: Websites and links

Using balance scales to visualise formulae	http://www.homeschoolmath.net/teaching/equations-1.php
Brilliant manipulative tool on a balance scale to solve formulae	http://www.mathsisfun.com/algebra/add-subtract-balance.html
Terms and the basics of what formulae are	http://www.mathsisfun.com/algebra/equation-formula.html
Questions to solve using balance scales, helps you write your own formulae	http://www.bgfl.org/bgfl/custom/resources_ftp/client_ftp/ks2/maths/weigh/1a.htm
Timed question game with various levels of difficulty	http://www.shodor.org/interactivate/activities/AlgebraQuiz/
Website full of free printable worksheets on solving and rearranging formulae	http://www.math-drills.com/algebra.shtml
Page of basic maths formulas, most of them used on L1/L2 course	http://www.basic-mathematics.com/basic-math-formulas.html

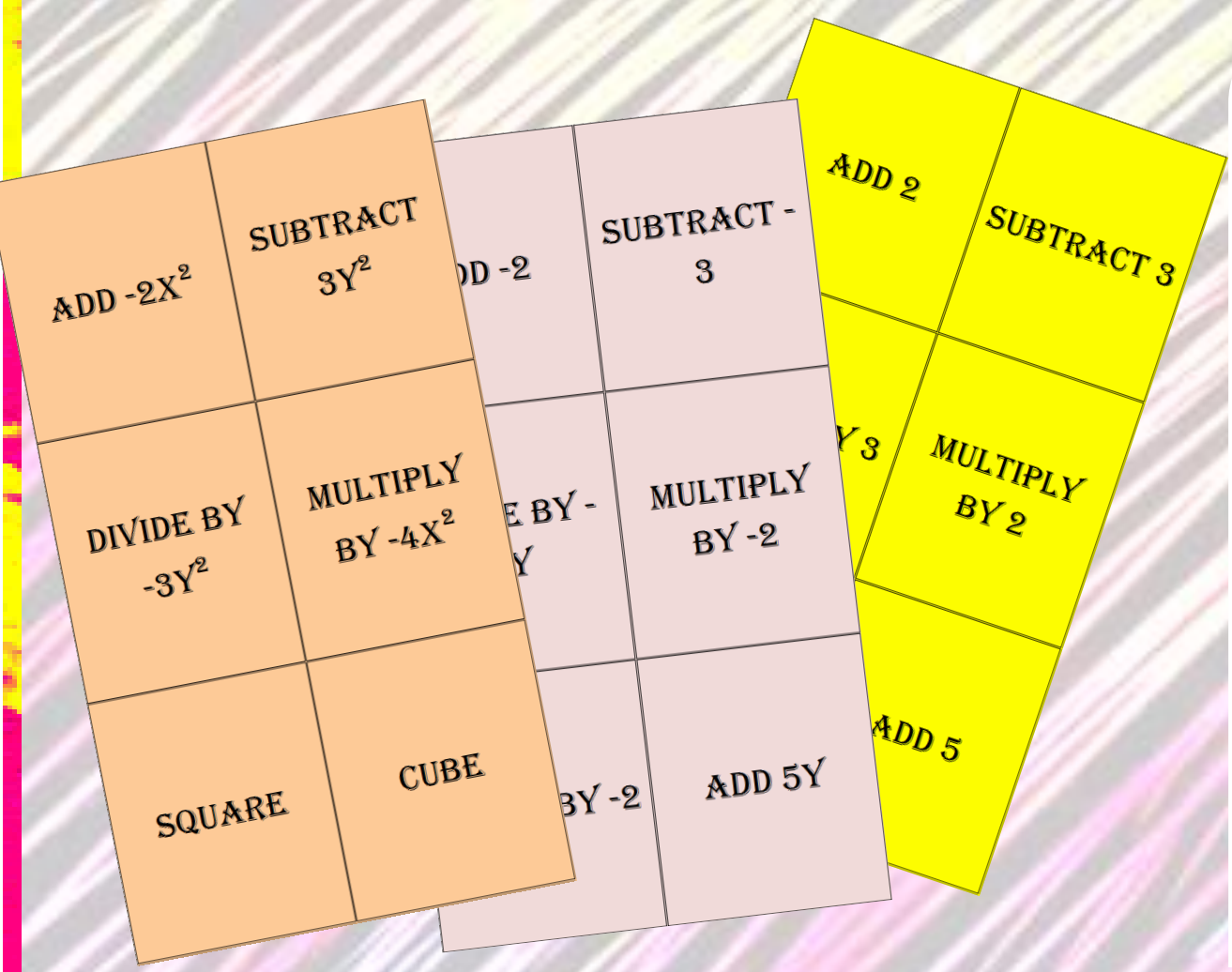
Tasia Puzzle

Work together to fit all the pieces together

If you complete the easy one,.. Can you do the harder??



Lesson: Activity B



Use the cards to create your own formulae and race each other to solve !!

1) Write down any number, place a card to the right of it, then write an equals sign
2) Make the other side of the equals balance
3) Swap equations and solve each others before the other player to win a point

First to 10 points wins !!

Extension:
Try building formulae using the Harder Sets of cards

Lesson: Activity C

Computer based activity - SCREEN CAST O MATIC

Create your own video !

Using screen cast o matic ***software, make your own video to share and save for your own revision detailing how to write and solve formulae***

Film yourself demonstrating…

1) ***How to write formulae***
2) ***How to replace letters with numbers and solving***
3) ***How to rearrange formulae***

Lesson: Activity E

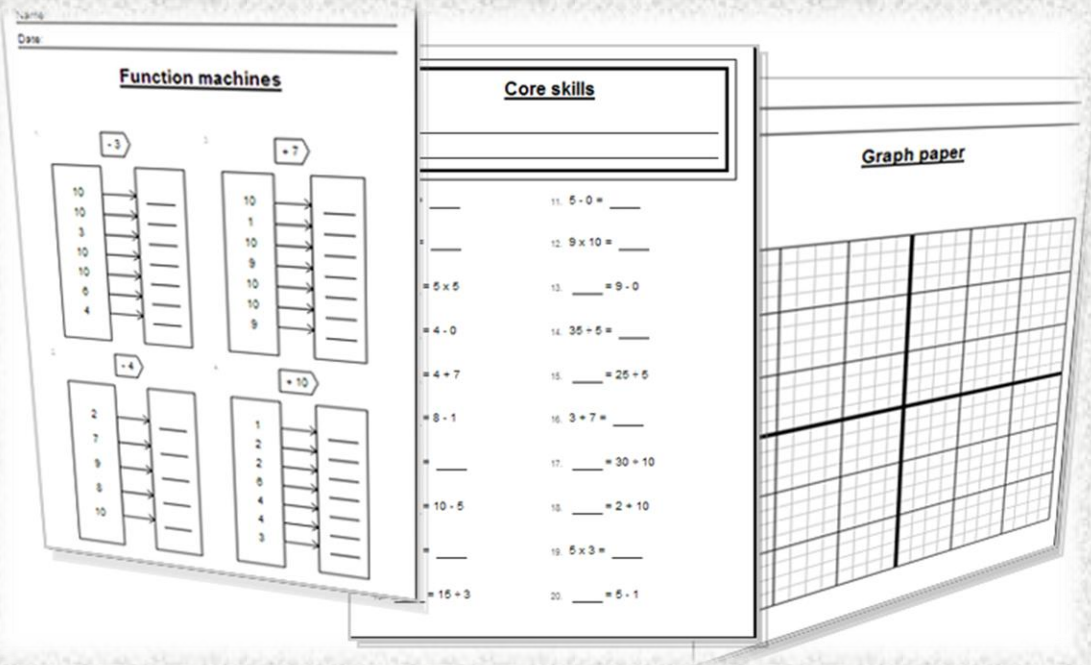
Try a variety of written practice

Worksheets

Workbooks

Practice Exam Papers

Maths Problems



Lesson: Practice – just the numbers

Solve the equations to find the value of x

1) $x + 4 = 10$
2) $2x - 6 = 14$
3) $X / 7 = 40$
4) $9x - 2 = 30$
5) $19 - x = 15$
6) $x + 3x = 20$
7) $(5+x) / 2 = 8$
8) $13 x = 26 - 4$
9) $40 x - 3 = 10$
10) $16 = x + 9 (4)$

Solve to find y

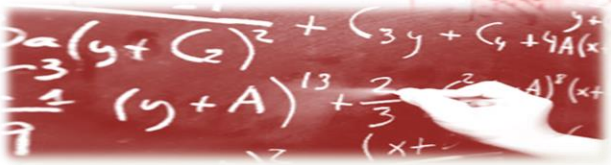
1) $2y = 19$
2) $5 + y = 2$
3) $30 / y = 10$
4) $25 - y = 20$
5) $y + y = 5$
6) $y / 10 - 2 = 15$
7) $8y - 2y = 0.4$
8) $6 (y + 8) = 50$
9) $4.2 + 8.3y = 100$
10) $- (4 + y) = - 2$

Rearrange so x is the subject

1) $X + 7 = c$
2) $4x (y) = 9 L$
3) $x/2 = 9$
4) $4 (x / 2) y = 1$
5) $Tx + 3 = C$
6) $x^2 = y - 2$
7) $6x + 20 = x$
8) $(x + 4)/50 = W$
9) $100y + 50 = -3x$
10) $9 x B = t / x$

Rearrange to make x the subject

1) $4 x^2 = 9$
2) $(x^2 + 3) /10= 15$
3) $Yx^2 - 4 = 0$
4) $-2 (5x^2) + 3 = -8$
5) $4UV/x^2 = 100$



Lesson: Practice – word problems

Q1 A carpet is priced a 'N' square metres multiplied by 'P' the price per metre plus £200 fitting fee. Write a formula to find 'T' the total cost using N and P variables.

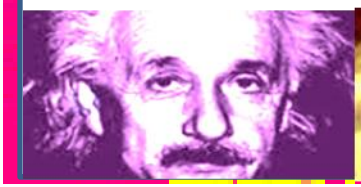
Q2 A sum of money 'I' is put into a bank and left for 'Y' years and receives 'P' percentage each year. Write a formula to show the amount in the bank 'T' after a number of years.

Q3 A temperature is converted from Celsius 'C' to Fahrenheit 'F' using the formula F= (9/5 C) + 32. Find F when C is 28.

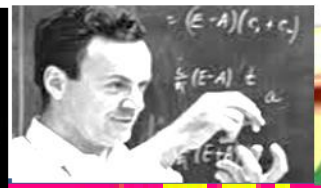
Q4 The formula for mixing a cocktail is that half is filled with 'J' juice plus 'A' alcohol and the rest 'S' soda. Find the total amount of liquid in the drink 'D' by writing a formula.

Q5 The weight limit in an lift is worked out by using the formula … 100N + 200 = T where 'N' is the number of people that the lift can safely carry and 'T' is the total weight limit of the lift. If the total weight limit 'T' is 1100 Kg, work out how many people can be safely carried.

Q6 The final speed 'v' an object reaches when falling due to gravity is given as $v^2 = u^2 + as$ Find the starting speed 'u' when v=20, the acceleration 'a' = 9.8 and the distance fallen (s) is 20.41m








End of Session Quiz LEVEL 2

2 Level Two

End of Session Quiz

FORMULA

Replace the letters in the following formula with the numbers on the left hand side to solve

1) If A=2 and B=3, 6A + 2B = _____

2) If X=1 and Y=10, XY – 3X = _____

3) If I=5 and J=1/2, 4J (2I) = _____

4) If S=6, T=2, U=4, ST(4+U) = _____

5) If Q=3/4 and P=1/2 1/2P + 2Q= _____

Solve the following

6) 8 + (T / 2) – 5 = 5, T= _____

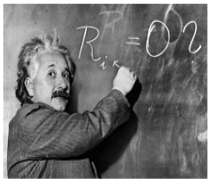
7) 4X – (1/2X) = 14, X= _____

8) (7(3 + 2) – 5) / 6 = _____

9) Tickets (T) are £5. Car parking (C) costs £2 per car. Booking fee is always £5

Using the following formula, how much does it cost (P) for seven tickets and three cars? P = 5T + 2C +5 _____

10) 20 - 5 x 2 + 3 = ? _____



How well did you do??

Score (out of ten) _____

TOPIC ANSWERS 1

Revision

TOPIC ANSWERS 2

9a Lesson Practice,

2 Level Two

End of Session Quiz

FORMULA - Answers

1) 18
2) 7
3) 20
4) 96
5) 7/4
6) 4
7) 4
8) 5
9) £46
10) 13

Progress Checker 2

What do you now know about Formulae? WHAT DID YOU LEARN? Write an example..

How would you now rate your skills in using formulae ?

1) Excellent ability
2) Good ability, but working to improve
3) Ok, making a start but I know I have lots to still learn

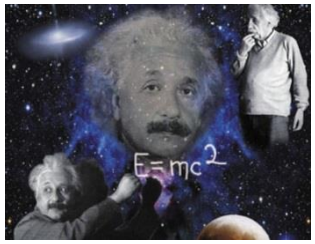
My aims for today **Date:** **were...**

A State what a formula is and when they are useful
B Read and write formulae using letters and symbols
C Replace formulae unknown values with numbers and solve to find answers to problems

$$QT = k \times \sqrt{RR}$$

$$\frac{5t}{4} + 3 = 18$$

UVC Length (cm) = [1.5 x birthweight (kg)] + 5.5



Continuing to Study and Learn

What else can you do to help yourself to learn and practice? Here are ten suggestions, record which you do each week and also record your progress.

Internet websites
Repeat the lesson, make notes, organise a folder, revise

Own maths workbook
Study together with a friend or family member

Finish activities in this book
Complete class handouts or tasks

Practice exams / past papers
Use maths skills learnt at home or at work in real situations

Play games
Experiment yourself, try new things ask yourself questions

Try making a graph of number of practice methods you use against your progress score in each topic. Are you showing more practice gives better results?