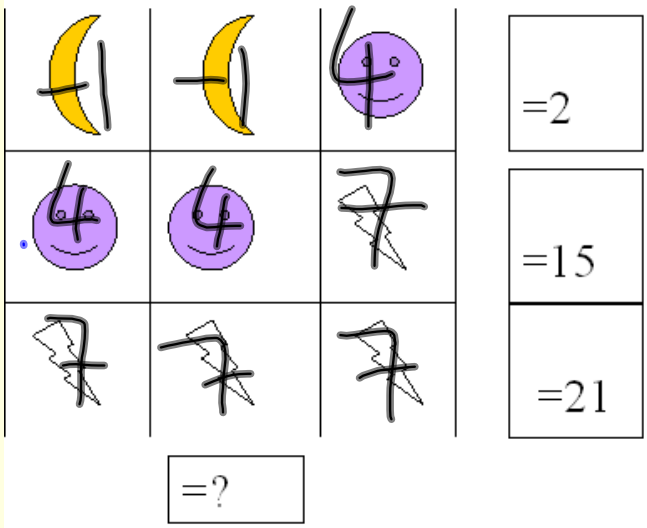
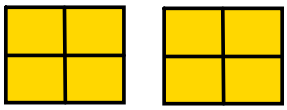
Solving Puzzles



worksheet

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41			44	45	46	47	48	49	50
51			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

43 44
53 54



Using letters instead of numbers

23	24
33	34

2	3
12	13

44	45	46
54	55	56

21	22
31	32

6	7
16	17

74	75	76
84	85	86

35	36	37
45	46	47

n	n+1	n+2
n+10	n+11	n+12

n-10	n-9	n-8
n	n+1	n+2

n-1	n	n+1
n+9	n+10	n+11

n-12	n-11	n-10
n-2	n-1	n

n-2	n-1	n
n+8	n+9	n+10

n-11	n-10	n-9
n	n+1	

Order of operations

$5 + 3 \times 2 = 11$

$(4+5) - (3 \times 5)$

$9 - 15 = -6$

$\frac{8}{2} = 4$

$4 \times 2 - 5 = 8 - 5 = 3$

$\frac{4+8}{3} = \frac{12}{3} = 4$

$8 - 2 \times 3 = 8 - 6 = 2$

$22 - 5 \times 2 = 22 - 10 = 12$

$2 \times 3^2 = 18$

$4 \times (2+5) = 4 \times 7 = 28$

$2 \times 9 = 18$

B rackets
I ndices (powers)
D ivision
M ultiplication
A ddition
S UBTRACTION

Match the corresponding terms:

2n 2xn

$\frac{n}{2}$ $n \div 2$

2 + n add 2 onto n

$2n^2$ 2 xn xn $(2n)^2 = 2n \times 2n$

n-2 **subtract 2 from n**

2 - n **take n from 2**

Simplifying expressions

a+a+a= $3a$

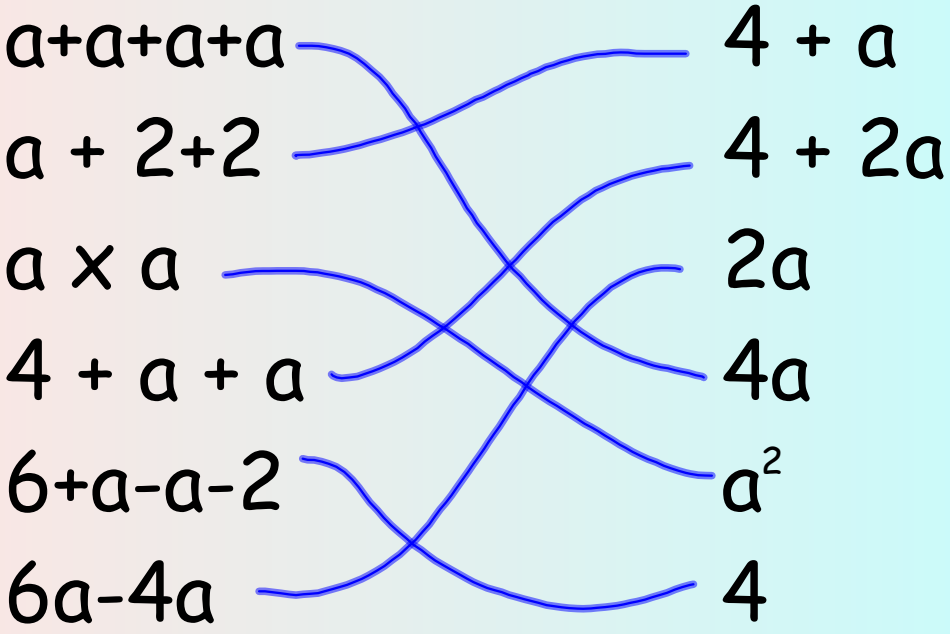
b+b= $2b$

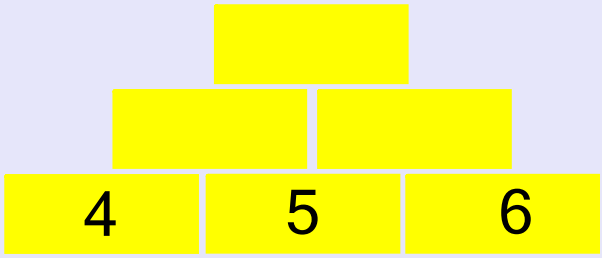
cxc= c^2

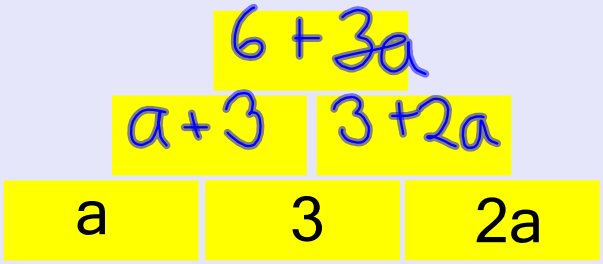
cxcxc= c^3

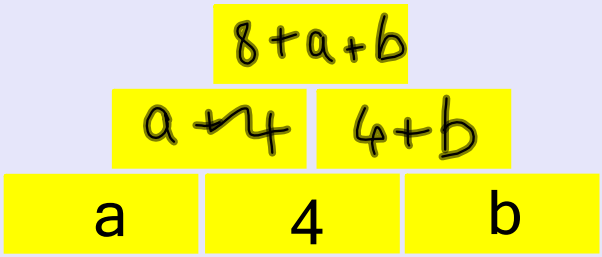
a+b-a= b

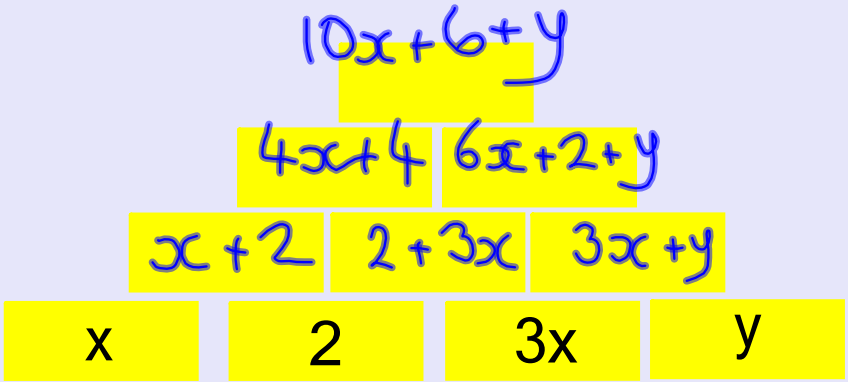
Match the expression to its partner.

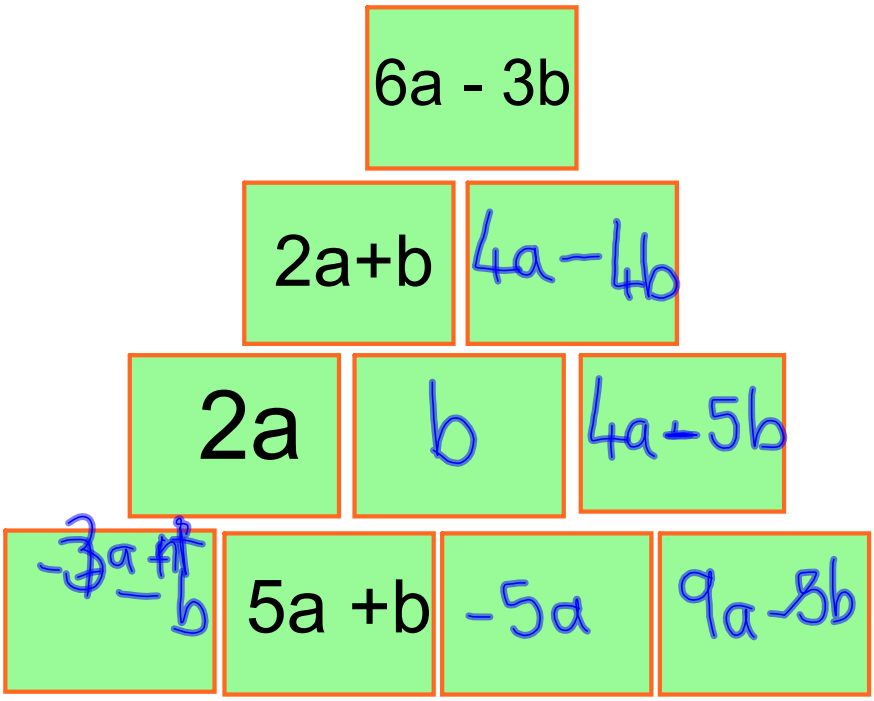


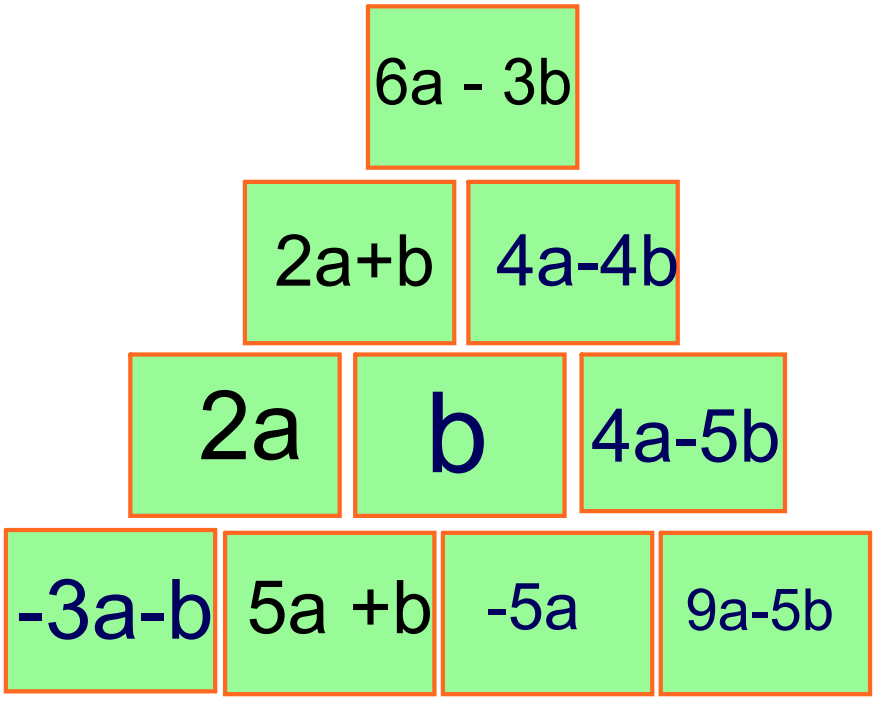

4
5
6


6+3a
a+3
3+2a
a
3
2a


8+a+b
a+4
4+b
a
4
b


10x+6+y
4x+4
6x+2+y
x+2
2+3x
3x+y
x
2
3x
y


6a - 3b
2a+b
4a−4b
2a
b
4a−5b
−3a−b
5a +b
-5a
9a-5b


6a - 3b
2a+b
4a-4b
2a
b
4a-5b
-3a-b
5a +b
-5a
9a-5b

Algebra : Substitution

If a=5 work out:

$3a^2$ $= 3 \times 25$
$= 75$

$3a = 3 \times a = 3 \times 5$
$= 15$

$5a-3 = 25-3 = 22$

$10-2a = 10-10$
$= 0$

$2a^3$ $= 2 \times 125$
$= 250$

$\frac{a}{2} = 2\frac{1}{2}$

$a^2 = 5 \times 5$
$= 25$

Substitution

If a=2 work out:

$3a = 3 \times 2 = 6$

$3a^2 = 12$

$5a - 3 = 10 - 3 = 7$

$10 - 2a = 10 - 4 = 6$

$a^2 = 2 \times 2 = 4$

$\frac{a}{2} = 2 \div 2 = 1$

$2a^3 = 2 \times \underbrace{2 \times 2}_{a^3} = 16$

Page 81
Page 83: 2 - 11

$5a^2$ $\frac{3a^2-10}{a+3}$ $2a^2$

$2a$ $5a$ $a+7$ $\frac{10a}{6}$

$4a-7$ $2a-1$

Let a= 2 and b=3. Work out:

5a + b = 10+3 13

5a + 3b= 10+9 19

ab= 2×3 6

9a - 3b= 18-9 9

$3a^2$ = 3×2×2 12

$2a^2$+ 5a = 8 + 10 18

1

12

page 81

Worksheet

Multiplying

5 x 73

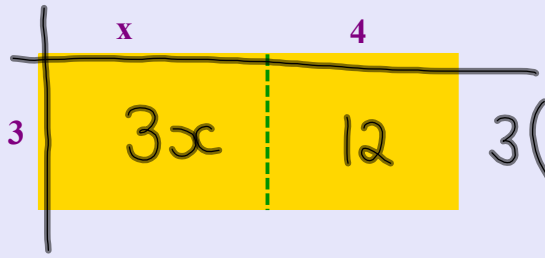
-365

	5
70	350
3	15
	365

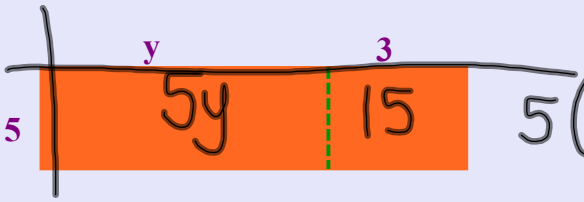
7 x 36

	30	6
7	210 +	42 = 252

Multiplying out a bracket



$3(x+4) = 3x+12$



$5(y+3) = 5y+15$

$4(x+6) = 4x+24$

$5(y+4) = 5y+20$

$10(5+b) = 50+10b$

$7(x-3) = 7x-21$

$6(a-8) = 6a-48$

$2(10-b) = 20-2b$

$5(2a+5) = 10a+25$

$7(3b-1) = 21b-7$

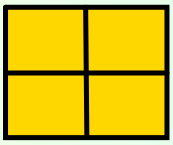
$3(a+b)+2b$

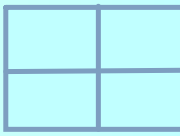
$= 3a+3b+2b$

$= 3a+5b$

What happens if..?

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
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



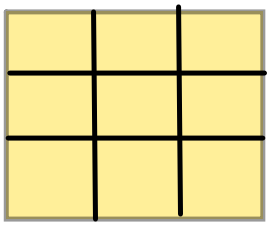


...you add the diagonals?

Can you prove this? (Use algebra)

What happens if you add all the numbers?

Try a 3x3 square.
Does the same thing happen?



For your 3x3 square, add the first column and the last column.
What do you notice?
Why do you think this happens?
Can you prove it?

I'm thinking of a number

I think of a number and add 2.

$n+2$

I think of a number and multiply by 2.

$2n$

I think of a number, add 3 and multiply by 4.

$4n+3$ ×

$4(n+3) = 4n+12$ ✓

I think of a number, multiply by 5 and add 2.

$5(n+2)$ ×

$5n+2$ ✓

What was my number?

I think of a number and add 2. I get 12.

$n+2=12$

I think of a number and multiply by 2. I get 50.

$2n=50$

I think of a number, add 3 and multiply by 4. I get 20.

$4(n+3)=20$

I think of a number, multiply by 5 and add 2. I get 32.

$5n+2=32$

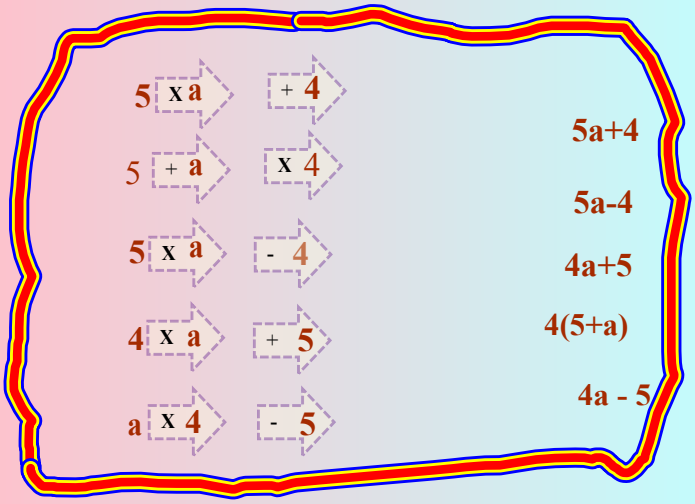
worksheet

DO NOT WRITE ON THE SHEET

Number machines

mapping worksheet from wws

Match the flow diagram to the expression:



Draw a flow diagram for these expressions:

1) 4a + 3

2) 3 + 2a

3) 4a - 3

4) 4(3+a)

5) 3(a-5)

1) y=4x + 3

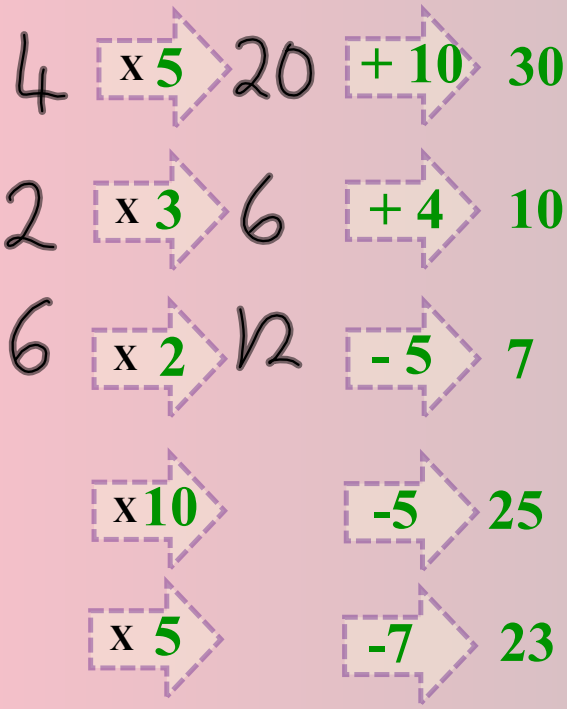
2) y= 3 + 2x

3) y= 4x - 3

4) y= 4(3+x)

5) y= 3(x-5)

Flow diagrams: backwards!



Reversing the flow!

6	x 5	30	+ 10	40	4	x 5	20	+ 10	30
5	x 3	15	+ 4	19	2	x 3	6	+ 4	10
12	x 2	24	- 5	19	6	x 2	12	- 5	7
5	x10	50	-5	45	3	x10	30	-5	25
10	x 5	50	-7	43	6	x 5	30	-7	23
5	x 3	15	+ 10	25	9	x 5	45	+ 10	55
2	x 7	14	+ 4	18	7	x 3	21	+ 1	22
11	x 2	22	-15	7	10	x 2	20	- 5	15
7	x10	70	-5	65	5	x10	50	-5	45
2	x 9	18	-7	11	7	x 5	35	+5	40

page 314

Solving Equations

x + 4 = 9

$x = 9 - 4$

$x = 5$

3x = 30

$x = \frac{30}{3}$ $\quad 30 \div 3$

$x = 10$

x - 5 = 12

$x = 12 + 5$

$x = 17$

2x + 1 = 7

$2x = 7 - 1$

$2x = 6$

$x = \frac{6}{2}$

$x = 3$

3x - 2 = 7

$3x = 7 + 2$

$3x = 9$

$x = \frac{9}{3}$

$x = 3$

Solving eqns in pairs page 79

Homework

mymaths:
substitution
probability

Wednesday

Solving equations

$3x - 1 = 11$

$3x = 11 + 1$

$3x = 12$

$x = \frac{12}{3}$

$x = 4$

Solve:

1) $3x - 7 = 2$
2) $5x - 1 = 19$
3) $2x + 11 = 13$
4) $6x - 5 = 25$
5) $10 + 2x = 11$

$3x = 2 + 7$

$3x = 9$

$x = 3$

$5x = 19 + 1$

$5x = 20$

$x = 4$

$6x = 25 + 5$

$6x = 30$

$x = 5$

$2x = 13 - 11$

$2x = 2$

$x = 1$

$2x = 11 - 11$

$2x = 1$

$x = \frac{1}{2}$

6c

5a

Solving equations with x on both sides

$x+x+1$

$2x + 1 = x + 9$

$(-x)$

$x+1 = 9$

$x = 9-1$

$x = 8$

$3x - 2 = x + 8$

$(-x)$

$2x-2 = 8$

$2x = 8+2$

$2x = 10$

$x = \frac{10}{2}$

$x = 5$

$4x + 3 = 5x$

$(-4x)$

$3 = x$

$x = 3$

$3x-2 = 5x -22$

$(-3x)$

$-2 = 2x -22$

$-2+22 = 2x$

$20 = 2x$

$10 = x$

Practice

1) $4x + 1 = 3x + 2$

$x+1 = 2$

$x = 2-1$

$x = 1$

2) $6x - 2 = 4x + 8$

$(-4x)$

$2x-2 = 8$

$2x = 8+2$

$2x = 10$

$x = \frac{10}{2}$

3) $10x - 1 = 5x + 9$

$x = 5$

$(-5x)$

$5x-1 = 9$

$5x = 9+1$

$5x = 10$

Friday 20th Jan

Hwk for Tuesday
page 87
Qu 6 a - g
Qu 9
Qu 4 parts 1 and 5(revision)

Forming expressions

width = x
length is 4cm more

length is y
width is 6cm less

An isosceles triangle
two sides are b cm
the third side is 3 cm more

short side is x cm
long side is 12 cm more

Attachments

Algebra pyramids.doc

Algebra pyramids answers.doc

function machines.doc

function machines2.doc

Yr 8 A2.doc