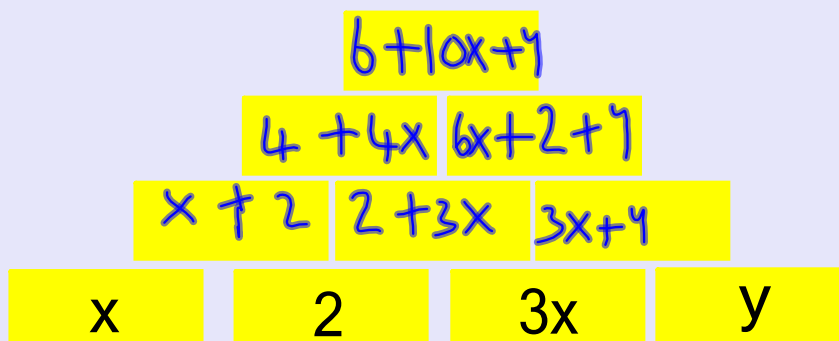
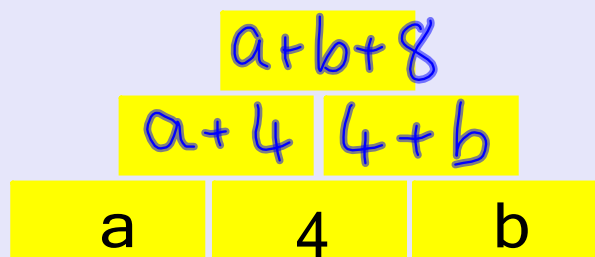
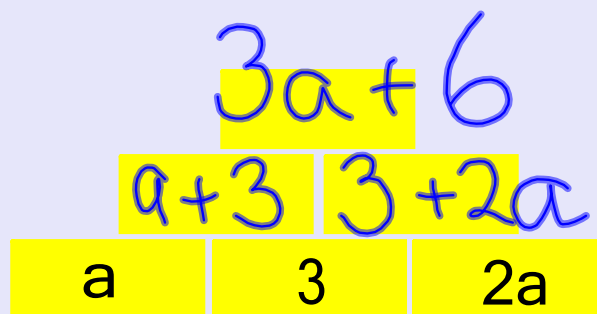


## Simplifying Expressions



## Simplifying expressions

1.  $a+a+a +a +b+b=4a + 2b$

2.  $b+b+ 2c+c+b= 3b+3c$

3.  $c+c= 2c$

4.  $x+x+3x+y= 5x+y$

5.  $a+h-a= h$

6.  $\underline{s+s-t}= 2s - t$

7.  $\underline{4t-3x+7t}= 11t - 3x$

8.  $a \times a = a^2$

9.  $6x \times b \times c = 6bc$

10.  $2y \times 3y = 6y^2$

$$2x + 3 + 3x + 1 = 5x + 4$$

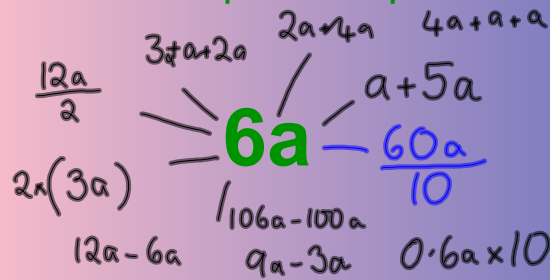
$$4x + 1 - 2 + 6x = 10x - 1$$

$$7x + 3 - 2x + 2 = 5x + 5$$

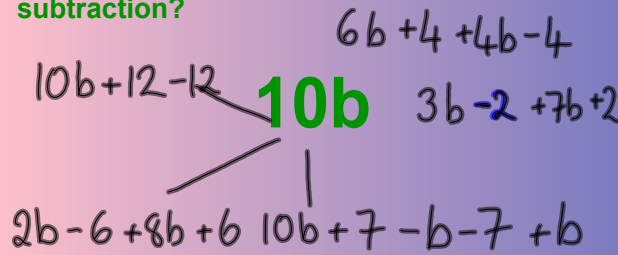
$$8x - 2 - 3x - 7 = 5x - 9$$

**Worksheet**

Write down 5 expressions equivalent to



Challenge: can you do some with subtraction?



$$8a^2$$

Answer = 12b

$$12b = 10b + 2b$$

$$12b = 5b + 2 + 7b - 2$$

$$12b = 2b - 2 + 10b + 2$$

$$12b = 7b + a + 5b - a$$

$$12b = 13b + 2 - 2 - b$$

20a = Answer

$$20a = 10a + 10a$$

$$20a = 7a + 13a$$

$$20a = 3a + 7 + 17a - 7$$

$$20a = 2a + b + 18a - b$$

$$20a = 25a - 4 + 4 - 5a$$

## Using two (or more) letters

$$2a + b + 3a + 3b =$$



Algebra cards

Multiplying out brackets




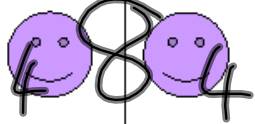




$$2(a+3b) = 2a + 6b$$

$$3(a - b) = 3a - 3b$$

$$4(a + 2b) = 4a + 8b$$

Edexcel intermed p328

## Solving Puzzles

|   |   |   |     |
|---|---|---|-----|
|    |    |    | =2  |
|    |   |    | =15 |
|  |  |  | =21 |
| <div style="border: 1px solid black; display: inline-block; padding: 5px;">=?</div> |   |   |     |

Match the corresponding terms:

$2n$     $2xn$

$\frac{n}{2}$     $n \div 2$

$2 + n$    add 2 onto n

$2n^2$     $2 \times n \times n$

$n - 2$    subtract 2 from n

$2 - n$    take n from 2

## Substitution

If  $a=5$  work out:

$$a + 10 = 15$$

$$3a = 15$$

$$\begin{array}{l} 10 - 2a = 0 \\ 10 - 10 = 0 \end{array}$$

$$\frac{a}{5} = 1$$

$$a - 2 = 3$$

$$5a - 3 = 22$$

$$7a = 35$$

$$a + 3 = 8$$

$$a^2 = 25$$

$$2a = 10$$

## Using negative numbers

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

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

$$-3 + -2 = -5$$

$$-6 \div (-2) = +3$$

$$-6 \div 2 = -3$$

$$-3 - (-2) = -1$$

|   |   |   |
|---|---|---|
| X | + | - |
| + | + | - |
| - | - | + |

page 182

## Substitution

If  $a = -5$  work out:

$$a + 10 = 5$$

$$a - 2 = -7$$

$$a^2 = 25$$

$$3a = -15$$

$$5a - 3 =$$

$$-25 - 3 = -28$$

$$2a = -10$$

$$10 - 2a =$$

$$10 - (-10) = 20$$

$$\frac{a}{5} = -1$$

$$7a = -35$$

$$a + 3 = -2$$

page 183

# BINGO

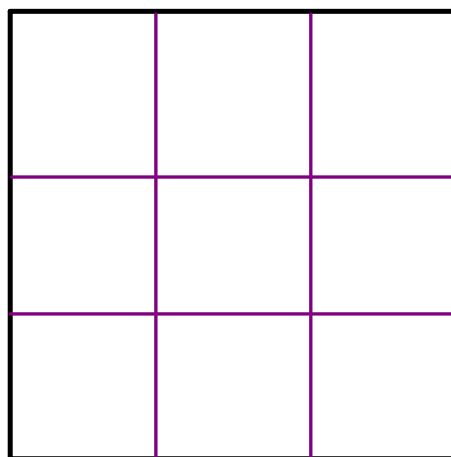
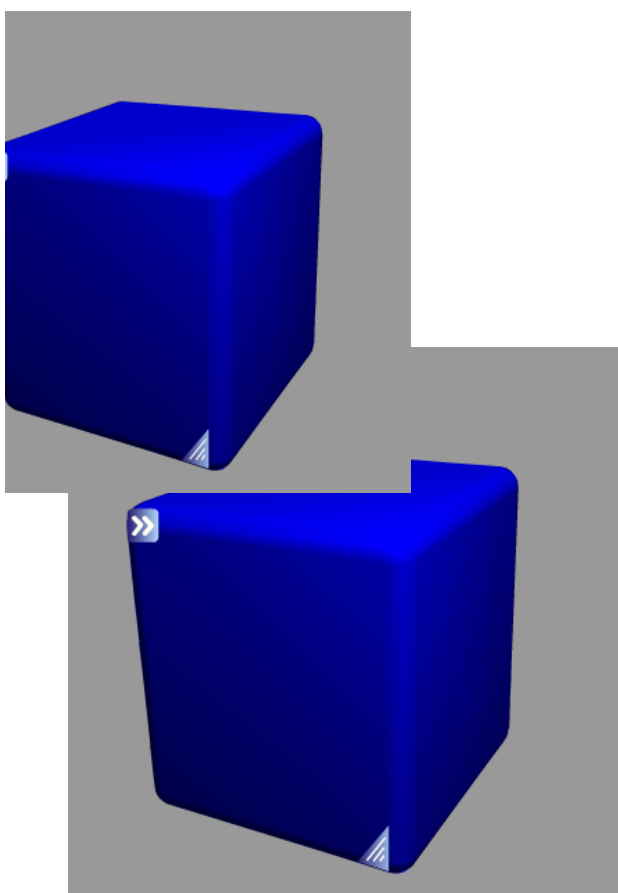


red + blue

|  |  |  |
|--|--|--|
|  |  |  |
|  |  |  |
|  |  |  |



# BINGO



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

$$5a + b = 13$$

$$5a + 3b = 19$$

$$ab = 6$$

$$9a - 3b = 18 - 9 = 9$$

$$3a^2 = 3 \times 4 = 12$$

Substitution

$$2a^2 + 5a = 2 \times 4 + 10 = 18$$

1

12

12

## A Formula for success



Jake has  $n$  books.  
He picks up another 4.  
How many does he have altogether?

$$n + 4$$

Lauren has  $x$  pencils.  
She lends out 3.  
How many does she have now?

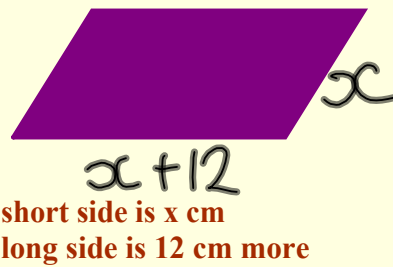
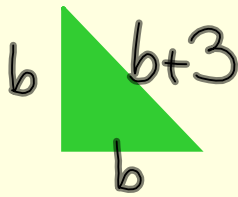
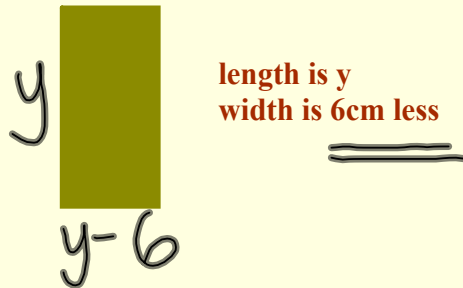
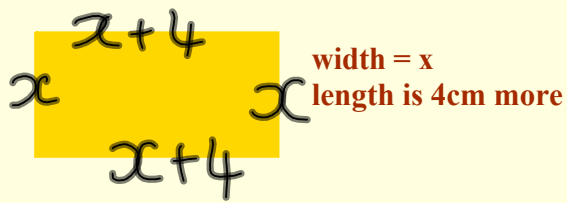
$$x - 3$$



Chloe has  $x$  scarves.  
Jess has twice as many.  
How many does she have?

$$\begin{array}{ll} x & \text{Chloe} \\ 2x & \text{Jess} \end{array}$$

## Forming expressions



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

page 223 D1- D11

D1

a)  $J = 24$

b)  $100 - n$

c)  $m - p$

## Solving equations

Start by making equations:

$$x=3$$

## Solve the equations

### Set 1

1)  $2x - 7 = 1$

2)  $3x + 6 = 24$

3)  $10 - 2x = 6$

4)  $4x + 1 = 9$

5)  $6x - 3 = 0$

### Set 2

1)  $2(x - 3) = 10$

2)  $3(x + 1) = 24$

3)  $4(10 - x) = 28$

4)  $2(x + 2) = 9$

5)  $4(2 + x) = 20$

### Set 3

1)  $2x - 3 = 10 + x$

2)  $3x + 1 = 2x + 5$

3)  $24 - x = 8 + x$

4)  $9x + 2 = 5x + 10$

5)  $4 + x = 20 - x$

## Attachments

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Algebra pyramids.doc

Algebra pyramids answers.doc

function machines.doc

function machines2.doc

Yr 8 A2.doc