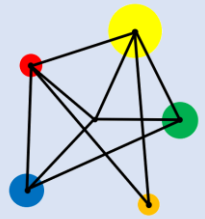
Create Expressions



Create expressions to describe real life situations

Vocabulary

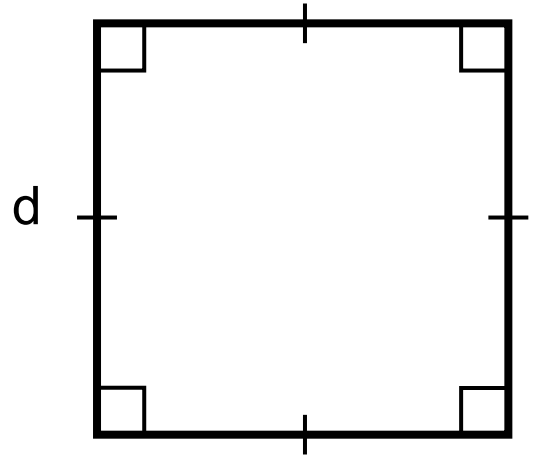
Expression
A collection of letters, numbers and mathematical symbols.

$$a + 3b + c^2$$

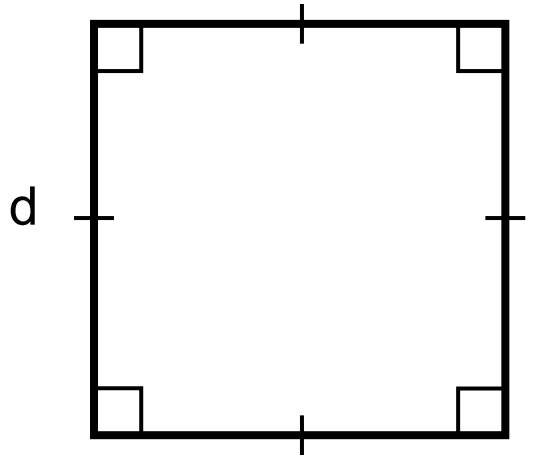
Algebra
The part of mathematics in which letters are used to represent numbers expressions.

Example

Find expressions for the perimeter and the area of this square.



Solution



Perimeter = d + d + d + d

= 4d

Area = d x d

= d^2

Example 2

Pens cost ‘p’ pence each.
Rulers cost ‘r’ pence each.

Alya buys 6 pens and 3 rulers.

Write an expression for the total amount Alya has to pay.

Solution

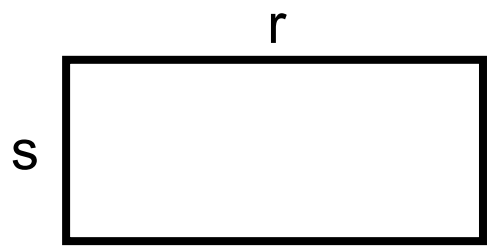
Pens cost ‘p’ pence each.
Rulers cost ‘r’ pence each.

Alya buys 6 pens and 3 rulers.

Write an expression for the total amount Alya has to pay.

6p + 3r **or** **3r + 6p**

1. Write down expressions for the area and the perimeter of this rectangle:



---

2. Black pens cost ‘b’ pence each.
Green pens cost ‘g’ pence each.
Red pens cost ‘r’ pence each.
Create an expression for the cost of:

a) 10 black pens
b) 1 green pen and 1 red pen
a) 2 red pens, 3 black pens & 5 green pens

3. x and y are integers

Write down an expression for:

a) The sum of x and y b) The product of x and y
c) The next integer after x
a) The integer that is twice as big as y
b) The mean of x and y

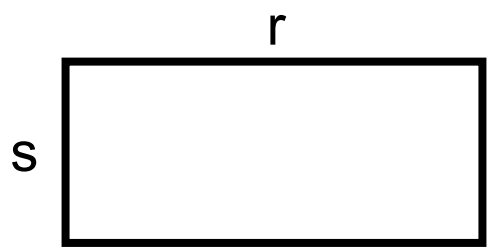
Challenge.
David thinks of a number. He calls the number ‘a’.
Write down an expression for the result at each stage.

a) David doubles his number
b) David adds ten to the result
c) David divides this result by 2
d) David subtracts the number he first thought of.

Repeat David’s operations on a few numbers of your own choice.

What do you notice?

1. Write down expressions for the area and the perimeter of this rectangle:



Area : rs **Perimeter: 2r + 2s**

---

2. Black pens cost ‘b’ pence each.
Green pens cost ‘g’ pence each.
Red pens cost ‘r’ pence each.
Create an expression for the cost of:

a) 10 black pens **10b**
b) 1 green pen and 1 red pen **g + r**
a) 2 red pens, 3 black pens & 5 green pens **2r + 3b + 5g**

3. x and y are integers

Write down an expression for:

x + y

a) The sum of x and y b) The product of x and y **x y**
c) The next integer after x **x + 1**
a) The integer that is twice as big as y **2y**
b) The mean of x and y $\frac{x+y}{2}$

Challenge.
David thinks of a number. He calls the number ‘a’.
Write down an expression for the result at each stage.

a) David doubles his number **2a**
b) David adds ten to the result **2a + 10**
c) David divides this result by 2 **a + 5**
d) David subtracts the number he first thought of. **5**

Repeat David’s operations on a few numbers of your own choice.

What do you notice? **Always results in 5**

Further Exercise

1. The length of a line is 6x metres.
   Write an expression for the length of the line in centimetres.

2. There are ‘g’ green counters in a bag and ‘b’ blue counters in the same bag.

   Write an expression for the total number of counters in 3 identical bags.

3. A television costs £400.

   The shop owner decides to reduce the price by £10 per week until it is sold.

   Write down an expression for the price of the television after ‘w’ weeks

4. A cube has sides of length ‘x’ cm.

   Write down expressions for the volume and surface area of the cube.

5. The price of a house increases by 5% each year.

   Write down an expression for the price of a house that initially cost £200 000 after n years.

Solutions

1. The length of a line is 6x metres.
   Write an expression for the length of the line in centimetres. **600x**

2. There are ‘g’ green counters in a bag and ‘b’ blue counters in the same bag.

   Write an expression for the total number of counters in 3 identical bags. **3g + 3b**

3. A television costs £400.

   The shop owner decides to reduce the price by £10 per week until it is sold.

   Write down an expression for the price of the television after ‘w’ weeks

   400 – 10w

4. A cube has sides of length ‘x’ cm.

   Write down expressions for the volume and surface area of the cube. **x^3 , $6x^2$**

5. The price of a house increases by 5% each year.

   Write down an expression for the price of a house that initially cost £200 000 after n years.

   $200\,000 + 1.05^n$

Extension

The two sequences below are called Fibonacci sequences because each term is found by adding the previous two terms..

1 , 1 , 2 , 3 , 5 , 8 , …

6 , 2 , 8 , 10 , 18 , …

A different Fibonacci sequence is given below.

a , b , … , … , . , …

Write an expression for the tenth term of this Fibonacci sequence.

Solution

The two sequences below are called Fibonacci sequences because each term is found by adding the previous two terms..

1 , 1 , 2 , 3 , 5 , 8 , …

6 , 2 , 8 , 10 , 18 , …

A different Fibonacci sequence is given below.

a , b , … , … , . , …

Write an expression for the tenth term of this Fibonacci sequence. **21a + 34b**

Exam Style Question

There are y tables in a restaurant.
There are 4 people at each table

a) Write an expression, in terms of y, for the total number of people in the restaurant.

b) Seven people leave the restaurant.
Write an expression, in terms of y, for the total number of people now in the restaurant.

Solution

There are y tables in a restaurant.
There are 4 people at each table

a) Write an expression, in terms of y, for the total number of people in the restaurant.

Total number of people = 4y

b) Seven people leave the restaurant.
Write an expression, in terms of y, for the total number of people now in the restaurant.

New number of people = 4y - 7