

Substitution

Find the value of $x^2 - 5xy$ when $x = 3$ and $y = -2$
Replace your x and y values with the numbers given and solve

Simplify Algebraic Fractions

$$\text{Simplify } \frac{1}{x+1} + \frac{2}{x-3}$$

Find a common denominator. In this case $(x+1)(x-3)$ and simplify it down. Only if there is an equals on top you can get rid of the bottom.

$$\text{Formula } \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Solve the equation
 $-3x^2 - 5x + 8 = 0$
Let $a = -3$, $b = -5$ and $c = 8$ and sub them into the formula to get two values for x .

Factorising

Factorise

Put in brackets according to type:
Common Factor -
 $6x^2 - 18x = 6x(x - 3)$
Grouping -
 $x^2 - ab - bx + ax = (x - b)(x + a)$
Quadratics
 $2x^2 - 5x - 12 = (2x + 3)(x - 4)$
Difference of Two Squares
 $x^2 - 25 = (x + 5)(x - 5)$

More Complex Functions

$f(x) = ax^2 + bx - 8$
 $f(1) = -9$ and $f(-1) = 3$ find the value of a and b
First sub in 1 for x and let it equal -9 . Then sub in -1 for x and let it equal 3. You will be left with two equations with which you can do a simultaneous equation to find a and b .

Simple Equations

$3(2x - 1) = 4x$
Get rid of brackets, x 's to one side, no 's to the other.

Rearranging

Express b in terms of a and c

$$\frac{8a - 5b}{b} = c$$

This means get b by itself.
Remove the fractions and bring all the b 's to one side. Factorise if needed.

Indices

Solve for x $(8^{\frac{1}{3}})(4^{\frac{1}{4}}) = 2^{5-x}$
Break down the equation so that each term has the same base number, in this case 2. Then let the powers on each side above the 2 equal each other.

Long Division

Divide $x^3 + 3x^2 - 4x - 12$ by $x - 2$

Divide the first number in $x - 2$ into the first number in $x^3 + 3x^2 - 4x - 12$ and put the answer on top, x^2 . Multiply this by $x - 2$ and put underneath. Change signs, cancel and tidy down. We repeat this same step up to 3 times. You will know that your answer is correct if when you subtract the last set of terms your answer is 0

Inequalities/ Numberlines

Show the solution set of
 $5x + 1 \geq 4x + 3$ on a numberline
Treat this like an equation with x 's to one side and numbers to the other.
 $x \in N$, $x \in Z$ means dots. $x \in R$ means shading.

Drawing Graphs

Draw the graph of the function
 $f(x) = 2x^3 - 5x^2 - 4x + 3$ in the domain $-1 \leq x \leq 3$
Put all the numbers in the domain from -1 to 3 into the equation. The numbers you put in are the x values of each point. The numbers you get out are the y values of each point. Make your graph as wide as possible.

Functions

$f(x) = 4x + 3$, find $f(2)$
Simply sub in 2 for x and solve

Graphs and Functions

The curve $f : x \rightarrow 2x^2 + ax + b$ crosses the x axis at $(-2, 0)$ and $(3, 0)$ find a and b
Here we make two separate equations. In the first we use $(-2, 0)$ and put in -2 for x and let it all equal to the y value, 0. We repeat this for the point $(3, 0)$, putting in 3 for x and let it equal to y value, 0. We are left with a simultaneous equation in a and b . Solve.

Simultaneous Equations

$$\begin{aligned} x + y &= 87 \\ 5x + 10y &= 650 \end{aligned}$$

Get either the x 's or the y 's the same by multiplying one or both of the lines. Change the signs if they are the same, cancel and then solve. Sub the value you get back into the top equation.

ALGEBRA Q3,4,5,6 Paper 1