

To differentiate expressions, you need to know the rules of indices.

Differentiation can be explained by multiply by the power then reduce the power by one.

This can be written in notation as

If $f(x)$ equals a times x to the power of n .

Then $f'(x)$ equals n times a times x to the power of n subtract one.

This can be used to differentiate $F(x)$ equals x^3 plus $2x$.

Multiply x^3 by three and subtract one from the power, to get $3x^2$.

x can be written as x to the power of one, multiply two by one, which is two.

Subtract one from the power to get zero.

x to the power of zero equals one, and two times one is two.

The final derivative is $f'(x)$ equals $3x^2$ plus two.

Remember the following terms and expressions mean the same when using differentiation.

$\frac{dy}{dx}$, $f'(x)$, gradient, derivative and rate of change.