POWER RULE

The Power Rule is used to differentiate terms and is a fundamental process involved in other rules of differentiation, like the quotient and product rule. The Power Rule is always applied to a term in this process.

DIFFERENTIATE $6x^4$

$f(x) = 6x^4$

$f'(x^n) = nx^{n-1}$

The exponent is brought down to the number next to the co-efficient. These two numbers are then multiplied together (the coefficient and the exponent) to get the product of these two integers. Sometimes, an exponent or co-efficient may be fraction, the same process still occurs, refer to multiplying fractions for more guidance.

1 is then subtracted from the exponent.

$f'(x) = 4 * 6(x)^{4-1}$

Numbers and values are then simplified accordingly in order to find the derivative of the term.

$f'(x) = 24x^3$

This means that the function $6x^4$ has a derivative of $24x^3$, which is a function that represents another function.

Here is another example with fractional and surd values, the same process is applied

$f(x) = \frac{1}{5}x^{\frac{7}{2}}$

$\therefore f'(x) = \frac{1}{5} * \frac{7}{2}x^{\frac{7}{2}-1}$

$\therefore f'(x) = \frac{7}{10}x^{\frac{5}{2}}$

$f(x) = \sqrt{2}x^{\sqrt{2}}$

$\therefore f'(x) = \sqrt{2} * \sqrt{2}x^{\sqrt{2}-1}$

$\therefore f'(x) = 2x^{\sqrt{2}-1}$

$Note: \sqrt{2} * \sqrt{2} = 2$