Name: _____ 5-a-day Further Maths

9th September

Corbettmaths

The nth term of a sequence is $\frac{1-3n}{4n+2}$

Write down the limiting value of the sequence $n \to \infty$

$= \frac{\frac{1}{n}-3}{4+\frac{2}{n}} \to -\frac{3}{4}$

A line has equation y = 2x + 11

The line crosses the x–axis at the point A
The line crosses the y–axis at the point B
The point C has coordinates (1, 9)
The point D is the midpoint of AB

Find the equation of the line that passes through C and D

$A\left(-\frac{11}{2}, 0\right)$

$B(0, 11) \Rightarrow D\left(-\frac{11}{4}, \frac{11}{2}\right)$

$C(1, 9)$

$m_{CD} = \frac{9-\frac{11}{2}}{1+\frac{11}{4}} = \frac{14}{15}$

$y - 9 = \frac{14}{15}(x-1)$

$y = \frac{14}{15}x + \frac{121}{15}$

$y = 3x^{10} - \frac{3}{x^2}$

Work out $\frac{dy}{dx}$

$= 3x^{10} - 3x^{-2}$

$\frac{dy}{dx} = 30x^9 + 6x^{-3}$

$= 30x^9 + \frac{6}{x^3}$

Prove $n^3 - n$ is always divisible by 6.

n is an integer greater than 1.

$n^3 - n = n(n^2-1) = (n-1)n(n+1)$

Product of 3 consecutive integers one of which is a multiple of 3 and at least one of which is even. $2 \times 3 = 6$.