The Primitive Function

If we know the equation of the tangent, how do we find the original curve?

If $f'(x) = x^n$, then the primitive function is;

$$f(x) = \frac{x^{n+1}}{n+1} + c$$

e.g. $(i)\ f'(x) = 3x^4$

$$f(x) = \frac{3x^5}{5} + c$$

$(ii)\ f'(x) = 6x^3 + 5x^2 + x + 2$

$$f(x) = \frac{6x^4}{4} + \frac{5x^3}{3} + \frac{x^2}{2} + 2x + c$$

$$f(x) = \frac{3}{2}x^4 + \frac{5}{3}x^3 + \frac{1}{2}x^2 + 2x + c$$

(*iii*) Find the equation of the curve which passes through (1,1) and has a gradient function of $2x + 3$

$$\frac{dy}{dx} = 2x + 3$$

$$y = x^2 + 3x + c$$

when $x = 1, y = 1$

$$\text{i.e. } 1 = 1^2 + 3 + c$$

$$c = -3$$

$$\therefore y = x^2 + 3x - 3$$

Exercise 4J; 1aceg, 2bdf, 3ace, 5bd, 6bce, 8ac, 9bdfi, 10d, 11bc, 12b, 15, 17, 18