

Evaluate these indefinite integrals:

(1)  $\int 3x^2 - 1 \, dx =$

(7)  $\int (6x^4 + 2x^2)^4 (6x^3 + x) \, dx =$

(2)  $\int \frac{1}{\sqrt{x}} \, dx =$

(8)  $\int \frac{x}{\sqrt{x^2+1}} \, dx =$

(3)  $\int \frac{3}{x^3} \, dx =$

(9)  $\int \frac{8x}{(5-3x^2)^2} \, dx =$

(4)  $\int \frac{(2x)(5-3x^2)-(x^2+1)(-6x)}{(5-3x^2)^2} \, dx =$

(10)  $\int (\sqrt{x} - \frac{1}{x})^3 (\frac{2}{\sqrt{x}} + \frac{4}{x^2}) \, dx =$

(5)  $\int (x\sqrt{x})(\frac{-3}{x^4}) + (\frac{3\sqrt{x}}{2})(\frac{1}{x^3}) \, dx =$

(11)  $\int \sqrt{\frac{x^{1/3}+1}{x^{4/3}}} \, dx =$

(6)  $\int 5(6x^4 + 2x^2)^4 (24x^3 + 4x) \, dx =$

(12)  $\int \frac{1}{x^4 \left[ \sqrt[3]{\left(\frac{3}{x^3}+3\right)^2} \right]} \, dx =$

Find all solutions to these differential equations that are of the form  $y = kx^n$ .

(13)  $y'' - \frac{y'}{x} = 0$

(14)  $y' = 2\sqrt{x}$

Find all solutions to these differential equations that are of the form  $y = ax^n + bx + c$ 

(15)  $y'x + x + 2 = 2y$