

fast

$$y = e^{x^2} + x$$

$$y^{(1)} = (2x+1)e^{x^2} + x$$

$$y^{(2)} = 2e^{x^2} + (2x+1)(2x+1)e^{x^2} + x$$

$$y = 2e^{x^2+x} + (2x+1)^2 e^{x^2} + x$$

$$y'(2x+1) + 2y$$

$$(2x+1)e^{x^2+x} + (2x+1) + 2(e^{x^2} + x)$$

$$(2x+1)^2 e^{x^2} + x + 2e^{x^2} + x$$

$$\text{but } y'' = 2e^{x^2} + x + (2x+1)^2 e^{x^2} + 2$$

$$y'' = y'(2x+1) + 2y$$

from the equation

Part A

$$A = y'', A' = y''', A'' = y^{(2+n)}$$

PART B

$$B = y'(2x+1)$$

$$u = y', u^n = y^{n+1}$$

$$v = 2x+1, v^{(1)} = 2, v^{(2)} = 0$$

$$B = y(n+1)(2x+1) + n(y^n)(2) + 0$$

$$B^n = (2x+1)y^{n+1} + 2ny^n$$

PART C

$$C = 2y$$

$$C^n = 2y^n$$

$$A^n + B^n + C^n$$

$$y^{n+2} = (2x+1)y^{n+1} + 2ny^n + 2y^n$$

$$y^{n+2} = (2x+1)y^{n+1} + 2y^n(n+1)$$

$$y^{n+2} = (2x+1)y(n+2) + 2(n+1)y^n$$

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MATHS ASSIGNMENT

$$y = e^{2x} + x$$

$$y^{(1)} = (2x+1)e^{2x} + 2$$

$$y^{(2)} = 2e^{2x} + (2x+1)(2x+1)e^{2x} + 2$$

$$y = 2e^{2x+2} + (2x+1)^2 e^{2x} + 2$$

$$y'(2x+1) + 2y$$

$$(2x+1)e^{2x+2} + (2x+1) + 2(e^{2x} + x)$$

$$(2x+1)^2 e^{2x} + x + 2e^{2x} + 2$$

$$\text{but } y'' = 2e^{2x+2} + (2x+1)^2 e^{2x} + 2$$

$$y'' = y'(2x+1) + 2y$$

From the equation

Part A

$$A = y', A' = y'', A'' = y^{(3)}, A''' = y^{(4)}$$

PART B

$$B = y'(2x+1)$$

$$u = y', v^n = y^{n+1}$$

$$v = 2x+1, v^{(1)} = 2, v^{(2)} = 0$$

$$B = y^{(n+1)}(2x+1) + n(y^{(n)})(2x+1)$$

$$B^n = (2x+1)y^{n+1} + 2ny^n$$

PART C

$$C = 2y$$

$$C^n = 2^n y^n$$

$$A^n + B^n + C^n$$

$$y^{n+2} = (2x+1)y^{n+1} + 2ny^n + 2y^n$$

$$y^{n+2} = (2x+1)y^{n+1} + 2y^n(n+1)$$

$$y^{n+2} = (2x+1)y^{n+1} + 2(n+1)y^n$$