

WRITE YOUR NAME:

MAP 2302 Quiz 17  
Tuesday November 5th

Write the general solution of the differential equation as a power series. Find the first four terms of the series. Use any correct method.

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

$$\downarrow$$
$$y'' = 2 \cdot y + (2x + 1)y'$$

$$\downarrow$$
$$y''' = 2 \cdot y' + 2 \cdot y' + (2x + 1)y''$$

$$y(0) = c$$

$$y'(0) = (2 \cdot 0 + 1)y(0) = 1 \cdot c = c$$

$$y''(0) = 2 \cdot y(0) + (2 \cdot 0 + 1)y'(0) = 2c + 1 \cdot c = 3c$$

$$y'''(0) = 2y'(0) + 2y'(0) + (2 \cdot 0 + 1)y''(0)$$

$$= 2c + 2c + 1 \cdot 3c = 7c$$

$$\text{First four terms are } y(0) + y'(0)x + \frac{y''(0)}{2!}x^2 + \frac{y'''(0)}{3!}x^3$$

$$= c + cx + \frac{3c}{2!}x^2 + \frac{7c}{3!}x^3$$

$$\text{or } c \cdot \left(1 + x + \frac{3}{2!}x^2 + \frac{7}{3!}x^3\right) \text{ or } c \cdot \left(1 + x + \frac{3}{2}x^2 + \frac{7}{6}x^3\right)$$