3.

$$2x\frac{d^2y}{dx^2} + y\frac{dy}{dx} - 6xy = 0$$

Given that $\frac{dy}{dx} = 3$ and $y = \frac{1}{2}$ at $x = 2$

(a) determine the value of $\frac{d^3y}{dx^3}$ at $x = 2$

(6)

(b) Hence determine the series expansion for y about $x = 2$, in ascending powers of $(x - 2)$ up to and including the term in $(x - 2)^3$, giving each coefficient in simplest form.

(2)

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