

$$f(x) = \left(2 - \frac{mx}{\sqrt{x^2+5}} \right) e^{x/2}$$

$$(uv)' = u'v + uv'$$

$$u(x) = 2 - \frac{mx}{\sqrt{x^2+5}} = 2 - mx(x^2+5)^{-1/2}$$

$$u'(x) = -mx(x^2+5)^{-1/2} - mx(-1/2 + 2x)(x^2+5)^{-3/2}$$

$$= m \left(-(x^2+5)^{-1/2} + x^2(x^2+5)^{-3/2} \right)$$

$$= \frac{m}{\sqrt{x^2+5}} \left(-1 + \frac{x^2}{x^2+5} \right) = \frac{m}{\sqrt{x^2+5}} \left(\frac{-x^2-5+x^2}{x^2+5} \right)$$

$$u'(x) = \frac{-5m}{(x^2+5)\sqrt{x^2+5}} = -\frac{5m}{(x^2+5)^{3/2}}$$

$$v(x) = e^{x/2}$$

$$v'(x) = 1/2 e^{x/2}$$

$$\therefore f'(x) = \frac{-5m}{(x^2+5)^{3/2}} + e^{x/2} + \left(2 - \frac{mx}{(x^2+5)^{1/2}} \right) + \frac{1}{2} e^{x/2}$$

$$= e^{x/2} \left[\frac{-5m}{(x^2+5)^{3/2}} + 1 - \frac{mx}{2(x^2+5)^{1/2}} \right]$$

$$= \frac{e^{x/2}}{\sqrt{x^2+5}} \left(\frac{-5m}{(x^2+5)} + \sqrt{x^2+5} - \frac{mx}{2} \right)$$