(6.) $y = (\cos x)^{e^{3x}}$

$\ln y = e^{3x} \ln \cos x$

$\frac{1}{y}\frac{dy}{dx} = e^{3x} \cdot \frac{1}{\cos x} \cdot (-\sin x) + \ln(\cos x) \cdot e^{3x} \cdot 3$

$\frac{1}{y}\frac{dy}{dx} = -e^{3x}\tan x + 3e^{3x}(\ln(\cos x))$

$\frac{dy}{dx} = (\cos x)^{e^{3x}}\left[-e^{3x}\tan x + 3e^{3x}\ln(\cos x)\right]$

$\frac{dy}{dx} = e^{3x}(\cos x)^{e^{3x}}\left[-\tan x + \ln(\cos^3 x)\right]$

(7.) $y = 2x^2 + 3x$

$y = 2(\ln(2t))^2 + 3\ln(2t)$

$y = 2(\ln(2t))^2 + 3\ln(2t)$

$\frac{dy}{dt} = 2 \cdot 2(\ln(2t)) \cdot \frac{1}{2t} \cdot 2 + 3 \cdot \frac{1}{2t} \cdot 2$

$\frac{dy}{dt} = \frac{4\ln(2t)}{t} + \frac{6}{2t}$

$\frac{dy}{dt} \quad \frac{4\ln 2t}{t} + \frac{3}{t}$

$\frac{dy}{dt} = \frac{4\ln 2t + 3}{t}$

(8) $m(t) = e^{\sin t}$

$m'(t) = e^{\sin t} \cdot \cos t$

$m'(t) = e^{\sin t}\cos t$

$0 = e^{\sin t}\cos t$

$0 = e^{\sin t}$ $\quad \cos t = 0$

~~$\ln 0 = \ln e^{\sin t}$~~ $\quad \boxed{t = \pi/2}$

(9.) $S(x) = p(x)e^{r(x)}$

$S'(x) = p(x) \cdot e^{r(x)} \cdot r'(x) + e^{r(x)} \cdot p'(x)$

$S'(x) = e^{r(x)}\left[p(x)r'(x) + p'(x)\right]$