(f) e^{-2x} $[0, 3]$

slope of secant line $\frac{e^{-6} - e^{0}}{3 - 0} = \frac{e^{-6} - 1}{3}$

$\frac{d}{dx} e^{-2x} = -2e^{-2x} = \frac{e^{-6} - 1}{3}$

$\ln\left(e^{-2x} = \frac{e^{-6} - 1}{-6}\right)$

$-2x = \ln\left|\frac{e^{-6} - 1}{-6}\right|$

$x = -\frac{1}{2}\ln\left|\frac{e^{-6} - 1}{6}\right|$

⑦ $y = x \ln x \quad [1, 2]$

slope of secant $= \dfrac{2\ln 2 - \ln 1}{1} = 2\ln 2$

slope of tangent $= 2\ln 2 = \ln x + 1$

$\dfrac{d}{dx} x \ln x =$

$\ln x + x \cdot \dfrac{1}{x}$

$\ln x + 1$

$(2\ln 2) - 1 = \ln x$

$e^{(2\ln 2) - 1} = x$

$\boxed{x \approx 1.47}$

$e^{2\ln 2} \cdot e^{-1} = e^{\ln 2^2} \cdot e^{-1}$

$= e^{\ln 4} \cdot e^{-1}$

$= \dfrac{4}{e}$

(17) f' is negative on $(1,3)$
positive everywhere else