

$$1) y = (-\lambda^2 + \mu)^{-10} \rightarrow y' = -10(-\lambda)(-\lambda^2 + \mu)^{-11} \quad : \text{Chain rule}$$

$$2) y = \sqrt{r\lambda - x^r} \rightarrow y' = \frac{r - rx}{r\sqrt{r\lambda - x^r}}$$

$$3) y = \frac{1}{rx^r + vx - 1} \rightarrow y = (rx^r + vx - 1)^{-1} \rightarrow y' = (-1)(\lambda x + v)(rx^r + vx - 1)^{-2}$$

$$4) y = \frac{1}{x} + \frac{1}{rx^r} + \frac{1}{rx^{2r}} \rightarrow y = x^{-1} + \frac{1}{r} x^{-r} + \frac{1}{r} x^{-2r} \rightarrow y' = -x^{-2} + \frac{1}{r}(-rx^{-r-1}) + \frac{1}{r}(-2rx^{-2r-1})$$

$$= -x^{-2} - x^{-r} - 2x^{-2r}$$

$$5) y = \sqrt{x^r + \sqrt{rx+1}} \rightarrow y = \frac{rx + \frac{r}{r\sqrt{rx+1}}}{\sqrt{x^r + \sqrt{rx+1}}}$$

$$6) y = \ln(\cos x + r) + \cos(\ln x + r) \rightarrow y' = \frac{-\sin x}{\cos x + r} + \frac{1}{x} \sin(\ln x + r)$$

$$7) y = x^E \ln(r\lambda^r - x) \rightarrow y' = E x^{E-1} \ln(r\lambda^r - x) + x^E \frac{-r\lambda^{r-1}}{r\lambda^r - x}$$

$$8) y = (\omega x^r - x^{-1})^F + \log(x - \sqrt{x}) \rightarrow y' = F(\omega x + x^{-r})(\omega x^r - x^{-1})^{F-1} + \frac{1 - \frac{1}{\sqrt{x}}}{(x - \sqrt{x}) \ln 10}$$

$$9) y = \sqrt{\frac{rx-1}{rx^r+1}} \rightarrow y' = \frac{\frac{r(rx-1) - rx^r}{2\sqrt{rx-1}}}{rx^r+1}$$

$$10) y = e^{E \cos x - x^r} \rightarrow y' = (-E \sin x - rx) e^{E \cos x - x^r}$$

$$11) y = \ln \sqrt{x^E + x^r + x^r + x + 1} \rightarrow y = \ln(x^E + x^r + x^r + x + 1)^{\frac{1}{2}} = \frac{1}{2} \ln(x^E + x^r + x^r + x + 1)$$

$$\rightarrow y' = \frac{1}{2} \frac{Ex^{E-1} + rx^{r-1} + rx^{r-1} + 1}{x^E + x^r + x^r + x + 1}$$

$$12) y = \sqrt{e^{x^r + rx + 1}} \rightarrow y' = \frac{(e^{x^r + rx + 1})'}{2\sqrt{e^{x^r + rx + 1}}} = \frac{(rx + r)e^{x^r + rx + 1}}{2\sqrt{e^{x^r + rx + 1}}}$$

$$13) y = \cot(rx^r - r) \rightarrow y' = -(rx)(1 + \cot^2(rx^r - r))$$

$$14) y = \frac{\lambda x}{\ln x} + \left(\frac{1}{rx} + \delta x^r\right) e^{\sqrt{x} - \delta x^{-1}}$$

$$15) y = \ln \frac{(x^r + 1)^{\delta} (r - rx)^F}{\sqrt{\cos x + v}} \rightarrow y = \ln(x^r + 1)^{\delta} (r - rx)^F - \ln(\cos x + v)^{\frac{1}{2}}$$

$$\rightarrow y = \ln(x^r + 1)^{\delta} + \ln(r - rx)^F - \ln(\cos x + v)^{\frac{1}{2}}$$