Ex 75

$f(x) = x\sqrt{x} - \sqrt{x} = uv - \sqrt{x}$ avec $u = x$ $\quad v = \sqrt{x}$

$u' = 1 \quad v' = \frac{1}{2\sqrt{x}}$

$$f'(x) = u'v + uv' - \frac{1}{2\sqrt{x}} = \sqrt{x} + x\frac{1}{2\sqrt{x}} - \frac{1}{2\sqrt{x}} = \frac{2\sqrt{x}\sqrt{x} + x - 1}{2\sqrt{x}} = \frac{2x + x - 1}{2\sqrt{x}} = \frac{3x-1}{2\sqrt{x}} =$$

$$= \frac{1}{2}\left(\frac{3x-1}{\sqrt{x}}\right) = \frac{1}{2}\left(\frac{3x}{\sqrt{x}} - \frac{1}{\sqrt{x}}\right) = \frac{1}{2}\left(3\sqrt{x} - \frac{1}{\sqrt{x}}\right)$$

Ex 76

$f(x) = \frac{1}{x+3} = \frac{1}{u}$ avec $u = x+3 \Rightarrow u' = 1$

$$f'(x) = -\frac{u'}{u^2} = -\frac{1}{(x+3)^2}$$

Ex 77

$f(x) = \frac{x+2}{2x+1} = \frac{u}{v}$ avec $u = x+2 \Rightarrow u' = 1$

$v = 2x+1 \Rightarrow v' = 2$

$$f'(x) = \frac{u'v - uv'}{v^2} = \frac{2x+1-(x+2)2}{(2x+1)^2} = \frac{\cancel{2x}+1-\cancel{2x}-4}{(2x+1)^2} = -\frac{3}{(2x+1)^2}$$

Ex 78

$f(x) = (\ln x)^2 - \ln x = u^2 - \ln x$ avec $u = \ln x \Rightarrow u' = \frac{1}{x}$

$$f'(x) = 2uu' - \frac{1}{x} = \frac{2}{x}\ln x - \frac{1}{x}$$

Ex 79

$f(x) = \frac{\ln x - 1}{\ln x + 1} = \frac{u}{v}$ avec $u = \ln x - 1 \Rightarrow u' = 1/x$

$v = \ln x + 1 \Rightarrow v' = 1/x$

$$f'(x) = \frac{u'v - uv'}{v^2} = \frac{\frac{1}{x}(\ln x + 1) - (\ln x - 1)\,1/x}{(\ln x + 1)^2} = \frac{\ln x + 1 - \cancel{\ln x} + 1}{x(\ln x+1)^2} = \frac{2}{x(\ln x+1)^2}$$