

calc 2005

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$$\begin{aligned}(1) \left\{ \frac{1}{(x^2+x+1)} \right\}' &= - \frac{(x^2+x+1)'}{(x^2+x+1)^2} \\ &= - \frac{2x+1}{(x^2+x+1)^2}\end{aligned}$$

$$\begin{aligned}(2) (x\sqrt{x})' &= (x)' \sqrt{x} + x (\sqrt{x})' \\ &= \sqrt{x} + x \cdot \frac{1}{2} \frac{1}{\sqrt{x}} \\ &= \frac{3}{2} \sqrt{x}.\end{aligned}$$

$$\begin{aligned}(3) (x^2 \sqrt{x})' &= (x^2)' \sqrt{x} + x^2 \cdot \frac{1}{2} \cdot \frac{1}{\sqrt{x}} \\ &= 2x \sqrt{x} + \frac{1}{2} x \sqrt{x} \\ &= \frac{5}{2} x \sqrt{x}.\end{aligned}$$

$$\begin{aligned}(4) \left(\frac{1}{\sqrt{x}} \right)' &= \frac{-(\sqrt{x})'}{(\sqrt{x})^2} = \frac{-\frac{1}{2} \frac{1}{\sqrt{x}}}{x} \\ &= -\frac{1}{2} \cdot \frac{1}{x\sqrt{x}}\end{aligned}$$

$$\begin{aligned}(5) \left(\frac{3x-1}{x+1} \right)' &= \frac{(3x-1)'(x+1) - (3x-1) \cdot (x+1)'}{(x+1)^2} \\ &= \frac{3(x+1) - (3x-1) \cdot 1}{(x+1)^2} \\ &= \frac{4}{(x+1)^2}\end{aligned}$$