17 on 11.9
Monday, May 05, 2014
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11.9
(17) $f(x)=\frac{x}{(1+4 x)^{2}}$

$$
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$$

consider $\frac{1}{(1+4 x)^{2}}$

$$
\begin{aligned}
& \frac{1}{1+4 x}=(1+4 x)^{-1} \\
& \left.\left[(1+4 x)^{-1}\right]^{\prime}=-4\right)(1+4 x)^{-2}
\end{aligned}
$$

So $\left[-\frac{1}{4} \cdot\left[\frac{1}{1+4 x}\right]\right]^{\prime}=\frac{1}{(1+4 x)^{2}}$

$$
\cdots \underbrace{1^{1+4 x}}_{\text {get }}(1+4 x)^{2}
$$

power series for this

$$
\begin{aligned}
\frac{1}{1+4 x} & =\frac{1}{1-(-4 x)} \\
& =\sum_{n=0}^{\infty}(-4 x)^{n}
\end{aligned}
$$

So $-\frac{1}{4} \cdot \frac{1}{1+4 x}=-\frac{1}{4} \sum_{n=0}^{\infty}(-4 x)^{n}$

$$
\begin{aligned}
\frac{1}{(1+4 x)^{2}} & \left.=\left[-\frac{1}{4} \sum_{n=0}^{\infty}(-4 x)^{n}\right]^{\prime}, \begin{array}{r}
-1<-4 x<1 \\
\\
\end{array} \quad \begin{array}{ll}
-\frac{1}{4}<x<\frac{1}{4} \\
R=\frac{1}{4} & \sum_{n=0}(-1)^{n} 4^{n} x^{n}
\end{array}\right]^{\prime}
\end{aligned}
$$

$$
\begin{aligned}
& =-\frac{1}{4} \sum_{n=1}^{\infty}(-1)^{n} 4^{n} n x^{n-1} \\
\frac{x}{(1+4 x)^{2}} & =-\frac{1}{4} \sum_{n=1}^{\infty}(-1)^{n} 4^{n} n x^{n} \\
& =\sum_{n=1}^{\infty}(-1)^{n+1} 4^{n-1} n x^{n} \\
& =\sum_{n=0}^{\infty}(-1)^{n} 4^{n}(n+1) x^{n+1}, R=\frac{1}{4}
\end{aligned}
$$

