P17

Find the Taylor Polynomial of degree 3 to $f(x)=e^x$ centered at $c=2$ to approximate $e^{2.5}$

$T_3(x)$ for $f(x)=e^x$ at $c=2$

$f(x)=e^x \quad f(2)=e^2$

$f'(x)=e^x \quad f'(2)=e^2$

$f''(x)=e^x \quad f''(2)=e^2$

$f^3(x)=e^x \quad f^3(2)=e^2$

Actual

$e^{2.5}=12.18249$

$$T_3(x)=\frac{e^2(x-2)^0}{0!}+\frac{e^2(x-2)^1}{1!}+\frac{e^2(x-2)^2}{2!}+\frac{e^2(x-2)^3}{3!}$$

$$e^{2.5}\approx T_3(2.5)=e^2+e^2(.5)+\frac{e^2(.5)^2}{2}+\frac{e^2(.5)^3}{6}$$

$$e^{2.5}\approx T_3(2.5)=12.16115$$

P18

Find the Maclaurin polynomial of degree 3 for $\ln(1+x)$ & use it to approximate $\ln(1.5)$

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

You should just know.

$$M_3(x)=x-\frac{x^2}{2}+\frac{x^3}{3}$$

$$\ln(1.5)=M_3(.5)=.5-\frac{(.5)^2}{2}+\frac{(.5)^3}{3}$$

$$\ln(1.5)=M_3(.5)=.41\overline{6}$$

$$\ln(1.5)=.40546$$