Taylor Series expansion

a) $f(x) = \sin(2x)$ and $x_0 = 0$

$$\sum_{x=0}^{\infty} (-1)^n \frac{(2x)^{2n+1}}{(2n+1)!}$$

b) $f(x) = \ln(2x)$ and $x_0 = 1$

$$\ln(2) + (x-1) - \frac{1}{2}(x-1)^2 + \frac{1}{3}(x-3)^3$$

$$\sum_{k=1}^{\infty} \frac{(-1)^k (-1+2x)^k}{k}$$

c) $f(x) = e^{2x}$ and $x_0 = 1$

$$e^2 + 2e^2(x-1) + 2e^2(x-2)^2 + \frac{8e^2(x-2)^3}{3!}$$

$$\sum_{0}^{\infty} \frac{(e^{2x})^n}{n!}(x-a)^n$$

d) $= 3x^2 - 2x + 5 \quad x_0 = 0$

$$5 - 2x + 3x^2$$

f) $3x^2 - 2x + 5 \quad x_0 = 1$

$$6 + 4(x-1) + 3(x-1)^2$$

g) $(3x^2 - 2x + 5)^{-1} \quad x_0 = 1$

$$\frac{1}{6} - \frac{x-1}{9} - \frac{1}{108}(x-1)^2 + \frac{5}{81}(x-1)^3$$

h) $f(x)$ and $x_0 = a$

$$f(a) + f'(a)(x-a) + \frac{f''(a)(x-a)^2}{2!} \ldots$$