1   ✠   Expand the following functions about the given center x_0 You can type this up using LaTeX or other word processor.

1. $f(x) = \sin 2x$ and $x_0 = 0$
$= 2x - \frac{4}{3}x^3 + \frac{4}{15}x^5 + O(x^7)$

2. $f(x) = \ln 2x$ and $x_0 = 1$
$= \ln 2 + x - 1 - \frac{1}{2}(x-1)^2 + \frac{1}{3}(x-1)^3 - \frac{1}{4}(x-1)^4 + O((x-1)^5)$

3. $f(x) = e^{2x}$ and $x_0 = 1$
$= e^2 + e^2(x-1)$

4. $f(x) = 3x^2 - 2x + 5$ and $x_0 = 0$
$= 3x^2 - 2x + 5$

5. $f(x) = 3x^2 - 2x + 5$ and $x_0 = 1$
$= 6 + 4(x-1) + 3(x-1)^2$

6. $f(x) = (3x^2 - 2x + 5)^{-1}$ and $x_0 = 1$
$= \frac{1}{6} - \frac{1}{9}x - 1 - \frac{1}{108}(x-1)^2 + \frac{5}{81}(x-1)^3 + O((x-1)^4)$

7. $f(x) = \cosh x - 3$ and $x_0 = 1$
$= \frac{e^2+1}{2e} - 3 + \frac{e^2-1}{2e}(x-1) + \frac{e^2-1}{4e}(x-1)^2 + \frac{e^2-1}{12e}(x-1)^3 + O((x-1)^4)$

8. $f(x)$ and $x_0 = a$
$f(a) + f'(a)(x-a) + f''(a)\frac{(x-a)^2}{2} + f'''(a)\frac{(x-a)^3}{6} + O(x^5)$

9. $f(a)$ and $x_0 = x$

$f(x) + f'(x)(a-x) + f''(x)\frac{(a-x)^2}{2} + f'''(x)\frac{(a-x)^3}{6} + O(x^5)$

10. $f(a+h)$ and $x_0 = a$
$f(a+h) + f'(a+h)(x-a-h) + f''(a+h)\frac{(x-a-h)^2}{2} + f'''(a+h)\frac{(x-a-h)^3}{6}$