Find the derivatives of the following functions:

1. $f(x) = (x^2 - 3x + 4)^4$,

2. $f(x) = \ln(22 + \sin(7x))$,

3. $f(x) = e^{-6x}(3x + 15)^2 + \ln(x^5 - 10)$,

4. $f(x) = x\sin(x^2 - 7)$,

5. $f(x) = \left(x^2 - e^{-x^3}\right)^{-1} + \dfrac{1}{x^2 + 4}$,

6. $f(x) = \left(x^4 - \cos(4x^5)\right)^6$.

7. $f(x) = \dfrac{1}{\sin^2(x^3)}$.

Find the derivative and second derivative of the functions below. Give the domain of each of the functions. Find the critical points, and determine if they are relative maxima or minima, for each graph. Find any points of inflection. Also, give the x and y-intercepts and any asymptotes if they exist. Decide if the function is odd, even or neither, and sketch the graph on separate paper.

8. $y = 2e^{-\frac{x^2}{2}}$,

9. $y = \ln(x^2 + 1)$,

10. $y = \dfrac{10x}{(1 + 0.1x)^2}$.