Problems   Product Rule.

Find the derivatives of the following functions:

1. $f(x) = (x^3 - 3x^2 + 7)(x^4 - 2x^2 + 6x - 1)$,   2. $f(x) = e^{2x}\cos(3x)$,

3. $f(x) = x^2 e^{-x} + 21\sqrt{x}$,   4. $f(x) = \frac{1}{x^2}\ln(x) - e^{2x}(x^2 - 1)$,

5. $f(x) = \frac{20\cos(7x)}{x^5} + (5x^5 + 11)\sin(2(x - 18))$.

Find the derivative and sketch the curves of the functions below. Give the domain of each of the functions. List all maxima and minima for each graph. Also, give the x and y-intercepts and any asymptotes if they exist. You should sketch the graphs on separate paper.

6. $y = (x - 2)e^{-x/2}$,   7. $y = \frac{5}{x^4}\ln(x)$,   8. $y = (x^2 - 3)e^x$.