Extra problems for Section 4.5

In problems (A)–(E), you are given a formula for $f'(x)$; in other words, you are given **THE DERIVATIVE** of f, not f itself.
In each problem:

- Find the critical numbers of f.

- Find the intervals of increase and decrease of f.

- Identify the local maxima and minima of f (if any).

- Find the x-values of the inflection points and intervals of concavity of f.

- Sketch one possible graph of f. (There will be many different possible answers.)

A. $f'(x) = \dfrac{x}{1+x^2}$.

B. $f'(x) = x^2 e^{-x^2}$.

C. $f'(x) = (\ln x)^2 - 4$. (Consider only the domain $x > 0$.)

D. $f'(x) = (x - 3)\sin x$. (Take the domain $[-1, 4]$. The x-values of the inflection points cannot be solved exactly, so get approximate solutions using a graphing calculator or a computer.)

E. $f'(x)$ has the following graph, with domain $[-3, 5]$: