1. Find all lines tangent to the curve \( y = x^3 + 14x^2 + 30x + 72 \) which pass through the origin.

2. Find, with proof, the absolute maximum of the function

\[
\begin{align*}
  f(x) &= \frac{1}{1 + |x - 2|} + \frac{4}{1 + |x - 5|}
\end{align*}
\]

3. Does the improper integral \( \int_0^1 \frac{e^{-1/x}}{x^3} \, dx \) converge?

4. What is the sum of this series?

\[
\sum_{n=1}^{\infty} \frac{(-3)^n - n}{4^n}
\]

5. For this function of two variables

\[
  f(x, y) = \begin{cases} 
    \frac{xy(x^2 - y^2)}{(x^2 + y^2)} & \text{if } (x, y) \neq (0, 0) \\
    0 & \text{if } (x, y) = (0, 0)
  \end{cases}
\]

compute \( f_{yx}(0, 0) - f_{xy}(0, 0) \) (that is, the value of \( \frac{\partial^2 f}{\partial x \partial y} - \frac{\partial^2 f}{\partial y \partial x} \) at the origin.)

Answers will soon appear at http://www.math.utexas.edu/users/rusin/Bennett/.