Applications of Partial Differentiation
Extremes

Question

Find and classify the critical points of the function

$$f(x, y) = xy - x + y$$

Answer

$$
\begin{aligned}
f_1 &= y - 1 \\
f_2 &= x + 1 \\
A &= f_{11} = 0 \\
B &= f_{12} = 1 \\
C &= f_{22} = 0
\end{aligned}
$$

Critical point $(-1, 1)$ is a saddle point since $B^2 - AC > 0$.