

Question 7

Adjacent contours differ by 6, with labels increasing in both positive coordinate directions. Along $+x$ they are 2 units apart; along $+y$ they are 3 units apart.

Tasks

1. Estimate both partial derivatives.
2. Relate spacing to magnitude.
3. Explain how decreasing labels change signs.

Question 7 – Solution

Strategy. Divide contour-value change by coordinate distance.

Step 1: Estimates $f_x \approx 6/2 = 3$ and $f_y \approx 6/3 = 2$.

Step 2: Spacing Equal output change over less distance gives larger slope, so the x trace is steeper.

Step 3: Sign If labels decrease in a positive direction, the corresponding partial is negative. Spacing controls magnitude; label order controls sign.