

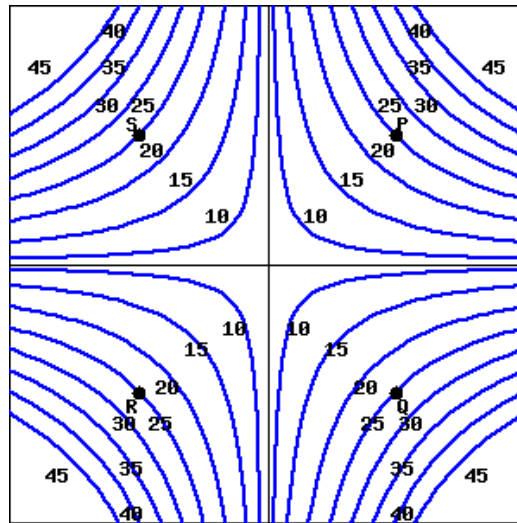
Math 211 Intro to Partial Derivatives

1. An experiment to measure the toxicity of formaldehyde yielded the data in the table below. The values show the percent $P = f(t, c)$ of rats surviving an exposure to formaldehyde at a concentration of c (in parts per million, ppm) after t months.

	$t=14$	$t=16$	$t=18$	$t=20$	$t=22$	$t=24$
$c=0$	100	100	100	99	97	95
$c=2$	100	99	98	97	95	92
$c=6$	96	95	93	90	86	80
$c=15$	96	93	82	70	58	36

- a. Estimate $f_t(18, 2) \approx$
- b. What is the practical meaning of $f_t(18, 2)$?
- c. Estimate $f_c(18, 2) \approx$
- d. What is the practical meaning of $f_c(18, 2)$?

2. Determine the sign of f_x and f_y at the points P, Q, R, and S, using the contour plot of f :



At point P, f_x is () positive or () negative and f_y is () positive or () negative

At point Q, f_x is () positive or () negative and f_y is () positive or () negative

At point R, f_x is () positive or () negative and f_y is () positive or () negative

At point S, f_x is () positive or () negative and f_y is () positive or () negative

3. Consider the function f defined by $f(x, y) = 8 - x^2 - 3y^2$. Determine $f_x(x, y)$ and $f_y(x, y)$.
- Find parametric equations for the tangent line to the trace $f(x, 1)$ at $x = 2$.
 - Find parametric equations for the tangent line to the trace $f(2, y)$ at $y = 1$.
 - Determine the equation of the plane that passes through the point $(2, 1, f(2, 1))$ whose normal vector is orthogonal to these two tangent lines.