

Quiz 5

Key

This is a two-stage quiz. During the first stage, use your knowledge & calculator. You have 15 min. In the second stage, you are now welcome to use your books, notes, and students in the class to retake the same quiz. You have the remainder of the quiz time to write one solution (with everyone's name on it!!!) to be turned in for the group.

1. [3] Create a function $f(x, y) = z$, with contour lines/level curves that satisfy all of the following

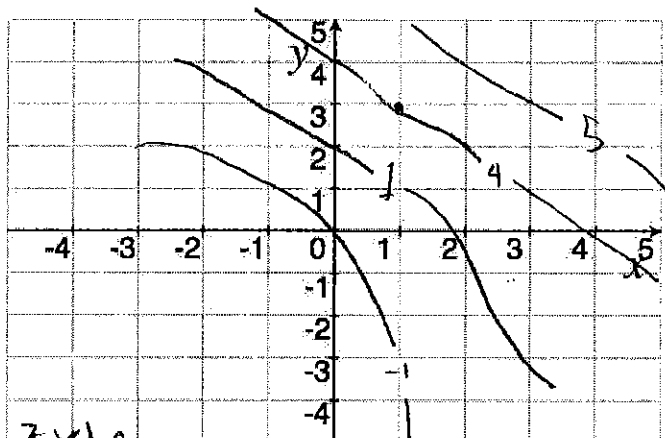
There are LOTS of answers!

(a) $f(1, 3) = 4$ (+1)

(b) $f(0, 0) = -1$ (+1)

(c) $f_x(1, 3) > 0$ (+1)

note @ (1, 3) if we move in positive direction, inc z value



2. A model for the surface area of a human body is given by the function:

$$S(w, h) = 0.109w^{0.425}h^{0.725}$$

where w is the weight (in pounds), h is the height (in inches), and S is measured in square feet.

- (a) [2] Find $S(200, 72)$ and interpret it.

(+1) $S(200, 72) = .109(200)^{.425} \cdot 72^{.725} \approx 23.0 \text{ ft}^2$

(+1) A 200lb person who is 6ft tall (72 inches) has about 23 ft² of surface area/skin

- (b) [2] Determine the set of points for which $S(w, h)$ is continuous/provide the domain for S . Briefly justify your answer.

Mathematically: Domain is when w and $h \geq 0$ b/c even powers

Reality: Domain is weight and heights should be set to a person's minimal weight & height. Minimally both w and h should be > 0 .

- (c) [3] Find $S_w(200, 72)$ and interpret its meaning.

$S_w(w, h) = .109(.425)w^{.425-1}h^{.725} \approx .04163w^{-.575}h^{.725}$
 power rule (+1.5) constant (+1.5)

$S_w(200, 72) = .04163(200)^{-.575}(72)^{.725} \approx .0489 \text{ ft}^2$ (+1.5)

(+1) If a 200lb and 6ft tall person increases their weight about 1lb, their surface area will inc about .05 ft²