Quiz 12

February 26, 2016

1. Which of the following is the domain of the function $f(x,y) = \dfrac{(x-3)\sqrt{x-y-2}}{e^{3x}\ln(xy)}$?

   (a) $\{(x,y)|x-y \geq 2, xy > 0, x \neq 0\}$
   (b) $\{(x,y)|x-y > 2, xy > 0, xy \neq 1\}$
   (c) $\{(x,y)|x-y > 2, xy \geq 0\}$
   (d) $\{(x,y)|x-y \geq 2, xy \geq 0\}$
   (e) $\{(x,y)|x-y \geq 2, xy > 0, xy \neq 1\}$

   $x-y-2 \geq 0 \rightarrow x-y \geq 2$
   $xy > 0$
   $\ln xy \neq 0 \rightarrow xy \neq e^0 = 1$

2. $f(x,y) = 12e^{(3\sqrt{4x^2+y^2})}$

   (a) What type of functions are the level curves?
   (b) Determine the y-intercept(s) (x,y) of the level curve where $z = 24$. (Round to three decimal places.)

a) $k = 12e^{3\sqrt{4x^2+y^2}}$
$\frac{k}{12} = e^{3\sqrt{4x^2+y^2}}$
$\ln(\frac{k}{12}) = 3\sqrt{4x^2+y^2}$
$(\frac{1}{3}\ln(\frac{k}{12}))^2 = 4x^2+y^2$
ellipse

b) $z=24$: $(\frac{1}{3}\ln(\frac{24}{12}))^2 = 4x^2+y^2$
$x=0$: $(\frac{1}{3}\ln(\frac{24}{12}))^2 = y^2$
$y = \pm\frac{1}{3}\ln(2)$
$= \pm .231$
$(0, \pm .231)$