

**Quiz 3**

1. Find the *domain* of the function:

$$f(x, y) = \frac{1}{\ln(8 - 2x^2 - 2y^2)}.$$

Sketch the domain.

2. Find the limit, if it exists:

$$\lim_{(x,y) \rightarrow (0,0)} \frac{x^2 - y^2}{x^2 + y^2},$$

or otherwise show that the limit does not exist.

3. Find the limit, if it exists:

$$\lim_{(x,y) \rightarrow (1,2)} \frac{x^2 - 2x + 1}{xy - y},$$

or otherwise show that the limit does not exist.