

14.2

#11

$$\lim_{(x,y) \rightarrow (0,0)} \frac{y^2 \sin^2(x)}{x^4 + y^4}$$

Along  $y=0$ , we have

$$\lim_{(x,0) \rightarrow (0,0)} \left( \frac{0}{x^4} \right) = 0$$

but along  $y=x$ ,

$$\lim_{(x,x) \rightarrow (0,0)} \frac{x^2 \sin^2(x)}{2x^4} = \lim_{x \rightarrow 0} \frac{1}{2} \left( \frac{\sin^2(x)}{x^2} \right) = \lim_{x \rightarrow 0} \frac{1}{2} \left( \frac{\sin(x)}{x} \right)^2 = \frac{1}{2}$$

so the limit D.N.E!