

Use our formal definition of the limit to prove each of the following:

1.
$$\lim_{(x,y) \rightarrow (0,0)} \frac{3x^4y}{(x^2 + y^2)^{3/2}} = 0$$

2.
$$\lim_{(x,y) \rightarrow (0,0)} \frac{5x^2y^2}{x^2 + 2y^2} = 0$$

3.
$$\lim_{(x,y) \rightarrow (0,0)} \frac{x^7y}{x^2 + y^2} = 0$$

4.
$$\lim_{(x,y) \rightarrow (0,0)} \frac{x^{2\phi}y}{\sqrt{x^2 + y^2}} = 0$$

5.
$$\lim_{(x,y) \rightarrow (0,0)} \sin^{-1} \frac{ex^4y}{\sqrt{x^2 + y^2}} = 0$$