

Answer the questions below. You may answer in the space provided. You may use the back or a separate sheet of paper if you need more space. You are to work in groups of no more than four people. Make sure to enter the names of your groupmates below.

Name: \_\_\_\_\_

Section: \_\_\_\_\_

Group Members: \_\_\_\_\_

1. Consider the function of two variables

$$f(x, y) = x \sin y.$$

- (a) (1 point) Calculate  $\frac{\partial f}{\partial x}$  and  $\frac{\partial f}{\partial y}$ .

- (b) (2 points) Find the critical points for  $f$

- (c) (2 points) Calculate the partial second derivatives of  $f$ .

- (d) (3 points) Determine if any of the critical points are relative minima, relative maxima, or saddle points.

2. (2 points) Calculate

$$\lim_{(x,y) \rightarrow (0,0)} \frac{xy^4}{x^2 + y^8}$$

along the curves  $x = y^4$  and  $x = 2y^4$ . What can you conclude about the limit above?