

Name:

1. Consider the function

$$f(x, y) = \frac{x^2 - y^3 + xy}{6}.$$

Find the equation to the tangent plane of the graph of  $z = f(x, y)$  at  $x = 2$  and  $y = -1$ .

2. For the function  $f(x, y)$  defined above, it's easy to compute that  $f(2, -1) = 1/2$ . Use your formula for the tangent plane to estimate  $f(2.1, -1.1)$ .

3. A cylindrical can has volume  $V = \pi r^2 h$  where  $r$  is the radius of the end and  $h$  is the height. Use differentials to estimate the error in the volume of a can if nominally  $r = 4$  cm and  $h = 10$  cm assuming that both  $r$  and  $h$  have tolerances of  $\pm 0.1$  cm.