

Calculus

Graduation Exam, 2021 Fall

1. Let  $l$  be a straight line parametrized by  $r(t) = (1 + t, 3 - t, 2t)$ . Find the distance from the point  $Q = (1, -1, 10)$  to the line  $l$ .
2. Let  $f(x, y) = |xy|$ . Show that  $f$  differentiable at  $(0, 0)$ .
3. Evaluate the integral

$$\int_0^{2\sqrt{\ln 3}} \int_{y/2}^{\sqrt{\ln 3}} e^{x^2} dx dy.$$