WESTERN UNIVERSITY
Department of Applied Mathematics

Last Name: Yulun **First Name:** Feng **Student Number:** 25111398 9

Calculus 2402A
ONBOARD QUIZ
Monday September 21, 2020
Part: III

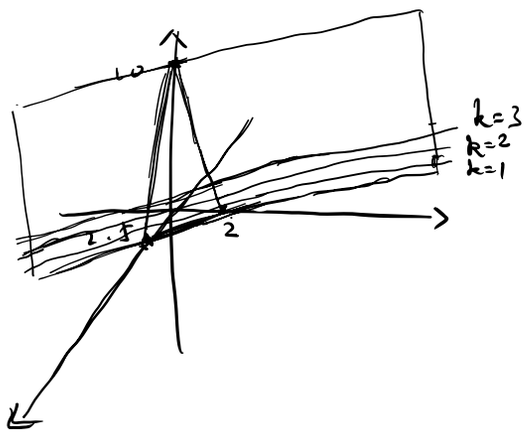
Show all your work, unjustified answers will receive little or no credit.

---

1. **[4 marks]** Evaluate $\lim\limits_{(x,y)\to(0,0)} \dfrac{xy^4}{x^4+y^4}$.

$$\lim_{x\to 0} \frac{xy^4}{x^4+y^4} = \frac{0\cdot y^4}{0+y^4} = 0$$

2. **[4 marks]** Sketch the graph of the function $f(x,y) = 10-4x-5y$ and sketch the level curves for $k = 1,\ 2,\ 3$.



3. [**4 marks**] Given $f(x,y) = \dfrac{ax+by}{cx+d}$, find f_x and f_y.

$f(x,y) = (ax+by)(cx+d)^{-1}$

$f_x = a(cx+d)^{-1} - c(ax+by)(cx+d)^{-2}$

$f_y = b(cx+d)^{-1}$

4. [**4 marks**] Find an equation of the tangent plane $z = 2x^2 + y^2 - 5y$ at the point $P(1,2,-4)$.

$z = f(1,2) + (x-1)f_x(1,2) + (y-2)f_y(1,2)$.

$f_x = 4x$

$f_y = 2y - 5$

$z = -4 + (x-1)\cdot 4 + (y-2)\cdot(-1)$

$z = 4x - y - 6$