Name: _____

Please show all work and justify your statements. Label sketches, draw conclusions (using complete sentences and including units), and box your final answers as appropriate.

1. Find a plane that intersects the graph of $z = (x^2 + 1)\sin y + xy^2$ in a **parabola**. Repeat the question for a **straight line**.

   Hint: in each case set one variable constant.

2. Determine whether $\dfrac{xy}{x^2 + y^2}$ has a limit as $(x, y) \to (0, 0)$.

   If yes, what is the limit? If no, explain why the limit fails to exist.

3. H.M.S. Jabanic encounters a 5 km/h current towards $30°$ south of east. If the engines can produce a maximum speed of 15 km/h in still water, what is the fastest progress Jabanic can make due west?

4. What is the angle between the planes $2x - 3y + 4z = 2$ and $x + y - 3z = 5$? What is the direction of the intersection of these planes?

5. Find the local linearization of $x\sin(y\ln x)$ at the point $(2, 1)$.

1	2	3	4	5	total (50)	%

Prelim. course grade: %