

Tangent Planes.

Spring 2016

Attendance Quizzes

February 24, 2016

Quiz 14 Tangent planes.

Consider the graph of the function:

$$f(x, y) = \sqrt{x^2 + y^2 + xy}$$

- ① Find $\nabla(z - f(x, y))$.

Answer: $\left\langle -\frac{2x+y}{2\sqrt{x^2+y^2+xy}}, -\frac{2y+x}{2\sqrt{x^2+y^2+xy}}, 1 \right\rangle$.

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

Answer: The equation of the graph is $z - f(x, y) = 0$.

Gradient of LHS from above gives the normal at $(1, -1, 1)$ as $\langle -1/2, 1/2, 1 \rangle$. The tangent plane is $-(1/2)(x - 1) + (1/2)(y + 1) + (z - 1) = 0$, or $2z = x - y$.