Quiz 1

1. By setting one variable constant, find a plane that intersects the graph of $z = 4x^2 - 8y^2 + 25$ in a:

   (a) Parabola opening upward: Set $y = 0$, then $z = 4x^2 + 25$.

   (b) Parabola opening downward: Set $x = 0$, then $z = -8y^2 + 25$.

   (c) Pair of intersecting lines: Set $z = 25$, then $x^2 = 2y^2$, so that $x = \pm\sqrt{2}y$, which gives the two lines $y = \frac{1}{\sqrt{2}}x$ and $y = -\frac{1}{\sqrt{2}}x$.

2. Find the equation of the linear function $z = c + mx + ny$ whose graph interstect the xz-plane in the line $z = 3x + 4$ and intersects the yz-plane in the line $z = y + 4$.

   When $y = 0$, $z = 3x + 4$, so $c = 4$ and $m = 3$, while when $x = 0$, $z = y + 4$, so $m = 1$. All together, these give $z = 4 + 3x + y$.