

MATH 1151 QUIZ-13 (15 minutes)

1. (5 points) Find the vertex, focus and directrix the parabola $y^2 + 12y = -x + 1$, graph the equation.

Solution: $y^2 + 12y + 36 = -x + 1 + 36$, $(y + 6)^2 = -(x - 37)$, so vertex is $(37, -6)$, focus is found by $4a = 1, a = \frac{1}{4}$, so focus is $(37 - \frac{1}{4}, -6)$ and the directrix is $x = 37 + \frac{1}{4}$. **Q.E.D.**

2. (5 points) Find center, foci and vertices of the ellipse $9x^2 + 4y^2 - 18x + 16y - 11 = 0$, graph the equation.

Solution: $9x^2 + 4y^2 - 18x + 16y - 11 = 9((x - 1)^2 - 1) + 4((y + 2)^2 - 4) - 11 = 0$, this is equivalent to $9(x - 1)^2 + 4(y + 2)^2 = 36$ which is equal to $\frac{(x-1)^2}{4} + \frac{(y+2)^2}{9} = 1$, so major axis is parallel to y-axis since $9 > 4$, center is $(1, -2)$, $4 + c^2 = 9$, so $c = \sqrt{5}$, so foci are $(1, -2 + \sqrt{5})$ and $(1, -2 - \sqrt{5})$, vertices are $(1, -2 + 3)$ and $(1, -2 - 3)$. **Q.E.D.**