Name:_____

Math 2030, Winter 2016, Quiz 2
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No calculators needed or allowed.

Let $\vec{r_0} = (1, 6)$ and $\vec{r_1} = (4, 0)$.

1. Compute the difference $\vec{v} = \vec{r_1} - \vec{r_0}$.
2. Write the parametric (i.e., explicit) equation $\vec{r}(t) = \vec{r_0} + t\vec{v}$ of the line through the points $\vec{r_0}$ and $\vec{r_1}$.
3. Find a vector $\vec{n}$ perpendicular to $\vec{v}$.
4. Write the implicit equation $\vec{n} \cdot \vec{r} + c = 0$ of the line through $\vec{r_0}$ and $\vec{r_1}$.
   (Hint: Simplify the equation by removing common factors if possible.)
5. Find the distance from $\vec{p_0} = (9, 5)$ to this line.

6. Write the parametric (i.e., explicit) equation $\vec{p}(t) = \vec{p_0} + t\vec{n}$ of the line through $\vec{p_0}$ in the direction of $\vec{n}$.

7. Find the intersection $\vec{p_1}$ of the two lines.
   (Hint: it is probably simplest to use the equations from problems (6) and (4) rather than those from (6) and (2).)

8. Compare the distance between $\vec{p_0}$ and $\vec{p_1}$ to your answer to problem (5).

9. Sketch the results in one drawing.