Practice Exam II Halleck v2 **MAT 1275** **Spring 2017**

Exam will last for exactly 1 hour. (The other 40 minutes will be devoted to the new material as scheduled.)

1. (5 points) Simplify each radical, complete the multiplication and then simplify once more.

$5\sqrt{-3x}\left(2\sqrt{28x^2}+4x\sqrt{-39x^5}\right)$

2. (5 points) Divide, leave in standard complex form:

$$\frac{6-4i}{10+9i}$$

3. (10 points) Put into standard form $ax^2+bx+c=0$ and then solve using completing the square:

$(x+3)^2+x^2+3=14x$

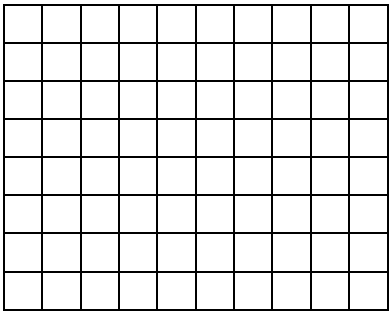
4. (10 points) Put into standard form $ax^2+bx+c=0$ and then solve using the quadratic formula:

$3x^2+11=14x$

5. (15 points) Find the vertex and y-intercept. Use factoring to solve the quadratic equation to find the x-intercepts. **Mark these 4 points on the provided graph paper and label with their coordinates.** Use the 4 points to help you sketch the quadratic function (parabola).

$y=2x^2-12x+10$

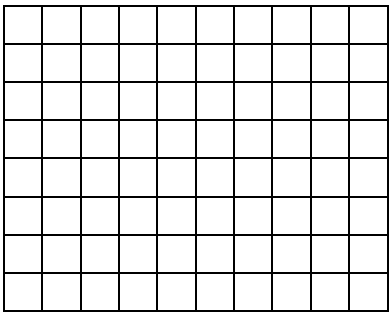
6. (10 points) If the endpoints of a line segment are **(−3, 2)** and **(1, −4)**. Find the equation of the perpendicular bisector in slope intercept form. Check by providing a quick sketch below of the line segment and the line.



7. (15 pts) Put equation of circle into standard form by completing square for both x and y. On **graph paper provided**, mark center as well as 4 points on circle. **Label 5 points with their coordinates.** Sketch graph.

$x^2 + y^2 - 4x + 6y + 4 = 0$

8. (15 points) Gas mileage depends in part on the speed of a particular car. The gas mileage of a car is given by the function $M(x) = -0.012x^2 + 1.2x + 10$ where x represents the speed in miles per hour and $M(x)$ is given in miles per gallon. Equation is valid from x = 40 mph until x = 80 mph. At what speed will the car get the maximum gas mileage?
   Find the vertex using formula method. Find the mileage at the lower and upper values of interval. Use these 3 points to provide a quick sketch below. Answer question with a complete sentence (include the units!).



9. (15 points) Solve the 3x3 system. You MUST use elimination. (Substitution not allowed.)
   Hint: look for variable with 1 or -1 as coefficient and eliminate it.

$$2x - 3y + z = -9$$
$$3x + 5y + 2z = 16$$
$$-4x + 2y - 3z = 4$$

Extra credit (10 points) Solve and graph as a check the nonlinear system:

$$\begin{cases} y = 2x^2 - 4x + 3 \\ x^2 - 2x + y^2 = 0 \end{cases}$$