

Math 1140F - Exam 1

Name: _____

Monday, September 8, 2014

Time: 50 minutes

Instructor: Brittany Cuchta

Instructions:

- Do not open the exam until I say you may.
- All cell phones and other electronic noisemaking devices must be turned off or completely silenced (i.e., not on vibrate) for the duration of the exam.
- **No calculators** are allowed on the exam.
- Failure to follow directions specific to a problem will result in the loss of points.
- Circle or box your final answer where appropriate.
- Show **all** work. Full credit will only be given if work is shown which **fully and clearly** justifies your answer.
- Answers must be exact (like $\sqrt{2}$), not approximate (like 1.414), unless a problem specifically indicates otherwise.
- All final answers must be simplified unless otherwise specified. **Rationalization is not required unless otherwise specified.**
- If you run out of room, use the back of the page and indicate this on the question.
- As always, you are expected to exhibit academic integrity during the exam.

Page:	1	2	3	4	5	Total
Points:	26	22	16	22	14	100
Score:						

1. (7 points) Is $-\frac{1}{3}$ a root of $3x^4 + x^3 - 3x + 1$?

Circle One: Yes No

2. (10 points) Find all real solutions:

$$\frac{x}{x^2 - 9} = \frac{4}{x + 3} + \frac{3}{x^2 - 9}$$

3. (9 points) Find all real solutions:

$$2 + \sqrt{12 - 2x} = x$$

4. (10 points) Find **all** solutions to $x^3 - 8 = 0$.

5. Let $P_1 = (-1, 3)$ and $P_2 = (4, -7)$.

(a) (3 points) Find the midpoint of P_1 and P_2 .

(b) (3 points) Find the distance between P_1 and P_2 .

(c) (4 points) Find the equation of the line containing P_1 and P_2 .

6. (2 points) What is the slope of the line perpendicular to the line $2x - y = 3$?

7. Solve the following in the real numbers. Give your answers in interval notation.

(a) (6 points) $3 - |x + 1| < \frac{1}{2}$

(b) (6 points) $\left| \frac{2x - 3}{2} + \frac{1}{3} \right| \leq 1$

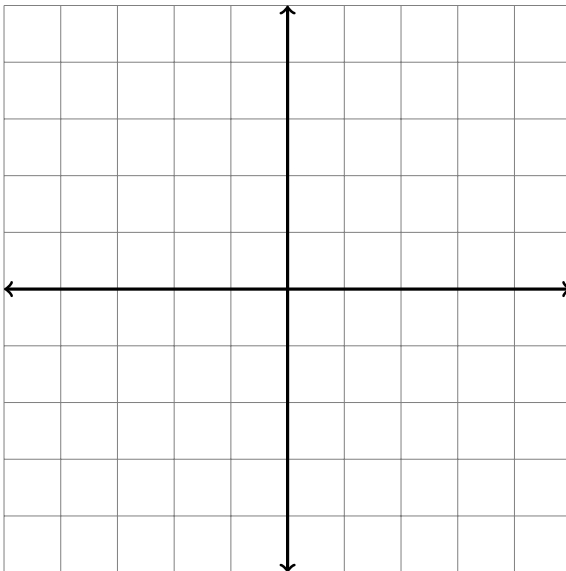
8. (4 points) Write $\frac{2 + 3i}{1 - i}$ in $a + bi$ form.

9. Consider the following circle equation:

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

(a) (12 points) Write the equation in standard form.

(b) (3 points) Graph the circle. Clearly label the center.



10. (7 points) Test $y = \frac{3x}{x^2 + 9}$ for any symmetry. List any intercepts.

Intercepts: _____

x-axis symmetry: Yes No

y-axis symmetry: Yes No

origin symmetry: Yes No

11. (7 points) At 10am, Danny is asked by his father to weed the garden. Danny takes 5 hours to do it by himself. His brother Mike takes 6 hours by himself. If Mike and Danny have a golfing reservation at 1pm, assuming not gain or loss in efficiency, will they be able to finish in time?

12. (7 points) How much water must be evaporated from 240 gallons of a 3% salt solution to make a 5% salt solution?