MA 153 Exam 2 Spring 2000

Name: _____

Circle your answer for problems 1-3. You must show correct work to receive credit.

(8 pts) 1. Find the midpoint of the points $A(-3,4)$ and $B(6,-5)$.

A. $(3,-1)$

B. $\left(-\frac{9}{2},\frac{9}{2}\right)$

C. $(1.-1)$

D. $\left(\frac{3}{2},-\frac{9}{2}\right)$

E. None of the above

(8 pts) 2. Find all solutions of the equation (real and/or complex):

$$3x^2 - 4x + 5 = 0$$

A. $x = 4 \pm \frac{\sqrt{11}}{3}i$

B. $x = -5,\ x = -\frac{1}{3}$

C. $x = \frac{2}{3} \pm \frac{\sqrt{11}}{3}i$

D. $x = -1,\ x = \frac{5}{3}$

E. $x = \frac{4}{3} \pm \frac{2\sqrt{11}}{3}i$

(8 pts) 3. Solve the inequality. Express your answer in interval notation.

$$3|2x - 7| - 8 \geq 10$$

A. $\left(-\infty,\frac{1}{2}\right] \cup \left[\frac{13}{2},\infty\right)$

B. $\left[\frac{1}{2},\frac{13}{2}\right]$

C. $\left(-\infty,\frac{19}{6}\right] \cup \left[\frac{23}{6},\infty\right)$

D. $\left[\frac{13}{2},\infty\right)$

E. $\left[\frac{19}{6},\frac{23}{6}\right]$

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Place your answer in the space provided. You must show correct work to receive credit.

(12 pts) 4. Find the general form $(ax + by = c)$ for the equation of the line that passes through the point $(-1,3)$ and perpendicular to the line $x - 2y = 14$.

(12 pts) 5. Find the center and radius of the circle given by:

$$x^2 + y^2 + 6x - 8y - 22 = 0$$

Center :

Radius:

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Place your answer in the space provided. You must show correct work to receive credit.

(12 pts) 6. Solve $2x^4 - 7x^3 - 15x^2 < 0$. Express your answer in interval notation.

(14 pts) 7. Solve for x. Check your answer(s).

$$\sqrt{5x-4} - x = -2$$

$x =$

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(14 pts) 8. The owner of an apartment complex has studied the occupancy of his building and has found that 55 units are occupied when the rent is $390 per month. However, when the rent has been raised to $430 per month, the number of occupied units dropped to 47. Assume that the number of occupied units is linearly related to the rent charged.

(10 pts) (a) Express the number of occupied units, N, in terms of the monthly rent, r.

N=

(4 pts) (b) What monthly rent should the owner charge to have 58 units occupied?

Monthly rent =

(12 pts) 9. A rectangular swimming pool is 5 meters wide and 10 meters long. A tile border of uniform width is to be built around the pool, using 100 square meters of tile. Find the width of the border. (Draw and label a picture, set up an equation, and solve.)

Width of border =

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Answers:

1. E.
2. C.
3. A.
4. $2x + y = 1$
5. Center = (-3, 4)
   Radius = $\sqrt{47}$
6. $\left(-\frac{3}{2}, 0\right)$ $(0,5)$
7. $x = 8$
8. a. $N = -0.2r + 133$
   b. $375
9. 2.5 meters