MAC 1147   Test IA
Spring 2012

A. Sign your scantron sheet in the white area on the back <u>in ink</u>.

B. Write <u>and code</u> in the spaces indicated:

  1) Name (last name, first initial, middle initial)

  2) UF ID number

  3) Discussion section number

C. Under "special codes" code in the test ID numbers 1, 1.

     ●   2   3   4   5   6   7   8   9   0

     ●   2   3   4   5   6   7   8   9   0

D. At the top right of your answer sheet, for "Test Form Code" encode A.

     ●   B   C   D   E

E. While taking the test, please <u>keep your answer sheet covered</u> or turned over <u>at all times</u>.

F. This test consists of 10 five-point multiple choice questions, 4 two-point bonus multiple choice questions and four pages of partial credit questions worth 30 points. The time allowed is 90 minutes.

G. WHEN YOU ARE FINISHED:

  1) Before turning in your test check for <u>transcribing errors</u>. Any mistakes you leave in are there to stay.

  2) You must turn in your scantron and tear off sheets to your discussion leader. Be prepared to show your picture I.D. with a <u>legible signature</u>.

  3) The answers will be posted within one day after the exam in Sakai.

NOTE: Be sure to bubble the answers to questions 1−14 on your scantron.

Part I: 5 points each

1. Given the following numbers:

$$0.15 \ , \ -\frac{\pi}{2} \ , \ \sqrt{-9} \ , \ 0 \ , \ \frac{\sqrt{2}}{3} \ , \ 0.\bar{2}$$

How many numbers above are rational?

a. 1   b. 2   c. 3   d. 4   e. 5

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2. Which of the following graphs has the symmetry with respect to the x-axis?

     P. $x = y^2$
     Q. $y = x^2$
     R. $x + y = 0$

a. P only   b. Q only   c. R only

d. P, Q and R   e. None

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3. If $x > 1$, simplify $\dfrac{2\,|1 - x|}{x - 1} - |3x - 3| = $ _____.

a. $1 - x$ b. $-1 - 3x$ c. $-1 + 3x$

d. $-5 - 3x$ e. $5 - 3x$

4. Rationalize the denominators and simplify:

$$\frac{2 - \sqrt{2}}{\sqrt{3} + 1} + \frac{3}{\sqrt{6}}$$

a. $\dfrac{\sqrt{3}}{2} + \dfrac{1}{2} + \dfrac{\sqrt{6}}{4} - \dfrac{\sqrt{2}}{4}$ b. $\dfrac{\sqrt{3}}{2} + \dfrac{1}{2} - \dfrac{\sqrt{6}}{4} - \dfrac{\sqrt{2}}{4}$

c. $\sqrt{3} - 1 - \sqrt{6} + \dfrac{\sqrt{2}}{2}$ d. $\sqrt{3} - 1 + \dfrac{\sqrt{2}}{2}$

e. None of the above

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5. If $f(x) = \dfrac{1}{x - 1}$, simplify the quotient $\dfrac{f(x) - f(3)}{x - 3}$.

a. $\dfrac{-1}{2(x - 3)}$ b. $\dfrac{1}{2(x - 3)}$ c. 1

d. $\dfrac{-1}{2(x - 1)}$ e. $\dfrac{1}{2(x - 1)}$

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6. Solve: $\dfrac{-6}{x^2 - 2x} - \dfrac{x}{2 - x} = \dfrac{2}{x}$

a. $\{-1 \pm 2\sqrt{3}\}$ b. $\{1 \pm 2\sqrt{3}\}$ c. $\emptyset$

d. $\{-1 \pm \sqrt{3}\}$ e. $\{1 \pm \sqrt{3}\}$

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7. Find the domain of the expression: $\sqrt{|3 - 2x| - 5}$

a. $[-4, 1]$ b. $(-\infty, -1] \cup [4, \infty)$ c. $(-\infty, \infty)$

d. $[-1, 4]$ e. $(-\infty, -4] \cup [1, \infty)$

8. Simplify: $\dfrac{5^{2+\sqrt{2}}}{(4+\sqrt{11})^{\sqrt{2}} \cdot (4-\sqrt{11})^{\sqrt{2}}}$

   a. $\dfrac{1}{25}$ b. $\dfrac{1}{5}$ c. 1   d. 5   e. 25

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9. Find the equation of the circle if the endpoints of the diameter are $(-8, 1)$ and $(2, 7)$.

   a. $(x-3)^2 + (y+4)^2 = 10$ b. $(x-3)^2 + (y+4)^2 = 34$

   c. $(x+3)^2 + (y-4)^2 = \sqrt{34}$ d. $(x+3)^2 + (y-4)^2 = 34$

   e. $(x+3)^2 + (y-4)^2 = 10$

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10. Find the **sum** of all the zeros of the function

$$f(x) = \sqrt{x+3} - 3\sqrt{x} + 1.$$

   a. $\dfrac{17}{16}$ b. $\dfrac{1}{16}$ c. 1   d. $\dfrac{1}{4}$ e. $\dfrac{5}{4}$

Continue on the next page!

Assume that $x \neq 0$ and $y \neq 0$.

11. $\dfrac{2}{x} + \dfrac{x}{5} =$

    a. $\dfrac{x+2}{x+5}$ b. $\dfrac{2}{5}$ c. $\dfrac{x^2+10}{5x}$

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12. $\sqrt{x^2} + \sqrt{5} =$

    a. $\sqrt{x^2+5}$ b. $|x| + \sqrt{5}$ c. $x + \sqrt{5}$

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13. $\dfrac{1}{x^{-1} + y} =$

    a. $\dfrac{x}{y}$ b. $\dfrac{x}{1+xy}$ c. $\dfrac{x}{1+y}$

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14. $(-3x^2)^3 =$

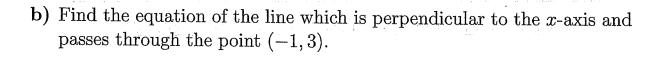   a. $-27x^6$ b. $-27x^5$ c. $-3x^5$

This is the end of the multiple choice section.

Be sure to work on the free response problems
on the next four pages.

Sect # _____   Name _____

UF ID _____   Signature _____

SHOW ALL WORK TO RECEIVE FULL CREDIT.

1. A local family-owned doughnut store sells a dozen of doughnuts for $5.50. If the cost to make a dozen of doughnuts is $2.00 plus a daily fixed cost of $120. Assume that the store sells x dozen of doughnuts daily.

   a) Find the daily revenue function.

   Revenue = _____

   b) Find the daily total cost.

   Total cost = _____

   c) Find the daily profit function.

   Profit = _____

   d) How many dozens of doughnuts must the store sell in order to make at least a profit of $160 each day?

   $x \geq$ _____

2. a) Find the equation of the line which is parallel to the x-axis and passes through the point $(-1, 3)$.

_____

b) Find the equation of the line which is perpendicular to the x-axis and passes through the point $(-1, 3)$.

_____

c) Find the slope of the line $2x - 3y = 5$.

slope $=$ _____

d) Find the slope of the line that is perpendicular to the line $2x - 3y = 5$.

slope $=$ _____

e) Find the equation of the line that is perpendicular to $2x - 3y = 5$ and passes though the point $(-1, 3)$.

$y =$ _____

3. Consider the quadratic equation $2x^2 - 2x - 3 = 0$.

a) Solve the equation using the completing the square.

$x = $ _____

b) Solve the equation using the quadratic formula.

$x = $ _____

c) Find the product of the two zeros of the equation.

product = _____

9A

4. Simplify the expression and write your answer without negative exponents.

a) $\dfrac{x^2(x^2+4)^{-1/2} - (x^2+4)^{1/2}}{x^2+4}$

b) $\dfrac{x^2y^{-1} + x^{-1}y^2}{y^{-1} + x^{-1}}$