

Final Exam  
Mathematics 1320 and 1420  
spring 2012

Name \_\_\_\_\_

Follow the instructions given to you by your instructor. The test consists of 20 multiple choice problems and 4 problems to be worked out completely.

- (1) Perform the indicated the operation and write the result in the standard form.

$$\sqrt{-9}(3 - \sqrt{-81})$$

- (a)  $27 + 9i$
- (b)  $9i + 27i^2$
- (c)  $9i - 27i^2$
- (d)  $9i - 27$
- (e)  $9 + 27i$

- (2) The inverse function of  $f(x) = \sqrt{x+1}$  is

- (a)  $\frac{1}{\sqrt{x+1}}$
- (b)  $(x+1)^2$
- (c)  $\frac{1}{(x+1)^2}$
- (d)  $x^2 - 1$
- (e)  $1 - x^2$

- (3) The partial fraction decomposition of  $\frac{11x - 35}{(x-1)(x-4)}$  is

- (a)  $\frac{3}{x-1} + \frac{1}{x-4}$
- (b)  $\frac{-3}{x-1} + \frac{-3}{x-4}$
- (c)  $\frac{3}{x-1} + \frac{2}{x-4}$
- (d)  $\frac{8}{x-1} + \frac{3}{x-4}$

- (4) Find the equation of the line passing through (2,4) and perpendicular to the line whose equation is  $y = \frac{1}{5}x + 4$  in the slope-intercept form

- (a)  $y = -\frac{1}{5}x - \frac{14}{5}$
- (b)  $y = -5x - 14$
- (c)  $y = -5x + 14$
- (d)  $y = 5x - 14$

- (5) Solve the equation

$$\frac{x-5}{2x} + 1 = \frac{2x+3}{3x}$$

- (a) -7
- (b) 5/21
- (c) 21/13
- (d) 21/5
- (e) 2/21

- (6) Find all the solutions of the logarithmic equation

$$\log_2 x + \log_2(x - 2) = 3$$

- (a) 1
- (b) 2
- (c) 3
- (d) 4
- (e) -2

- (7) Find the solution set of the logarithmic equation
- $\log(2x - 1) - \log(x + 3) = \log 3$

- (a) {7}
- (b)  $\phi$
- (c) {-10}
- (d) {10}

- (8) Perform the following operation

$$5\sqrt{-16} + 3\sqrt{-81}$$

- (a)  $21i$
- (b)  $24i$
- (c)  $47i$
- (d)  $323i$
- (e) -21

- (9) Find the domain of the rational function:
- $f(x) = \frac{x+5}{x^2-9x}$

- (a)  $\{x : x \neq -3, x \neq 3, x \neq -5\}$
- (b)  $\{x : x \neq 0, x \neq 9\}$
- (c) all real numbers
- (d)  $\{x : x \neq -3, x \neq 3\}$

- (10) Find the answer for the following division in standard form

$$\frac{-6i}{3 + 2i}$$

- (a)  $\frac{12}{13} - \frac{18i}{13}$
- (b)  $-\frac{1}{3} + \frac{6i}{3}$
- (c)  $-\frac{6i}{3} + \frac{1}{2}$
- (d)  $-\frac{18i}{3} - \frac{12}{3}$
- (e)  $-\frac{12}{13} - \frac{18i}{13}$

- (11) Solve the logarithmic equation
- $3 \ln(2x) = 12$
- to find the value of
- $x$

- (a)  $e^4$
- (b)  $e^4/2$
- (c)  $e/4$
- (d)  $\{\phi\}$
- (e) None of the above

- (12) The solution of  $cx^2 + ax + b = 0$  is
- $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
  - $x = \frac{-a \pm \sqrt{a^2 - 4cb}}{2c}$
  - $x = \frac{-c \pm \sqrt{c^2 - 4ab}}{2b}$
  - $x = \frac{-b \pm \sqrt{b^2 - 4ca}}{2a}$
  - $x = \frac{-c \pm \sqrt{c^2 - 4cb}}{2b}$
- (13) Find the resulting set of  $[1, 3] \cap (2, 6)$
- $(1, 6)$
  - $(1, 6]$
  - $[2, 3)$
  - $(2, 3]$
- (14) What is the slope of the line which is perpendicular to the line passing through  $(-3, 6)$  and  $(3, -2)$ ?
- $5/9$
  - $-9/5$
  - $-4/6$
  - $-4/3$
  - $3/4$
- (15) Calculate the average rate of change of  $f(x) = 3x^2 + 2x$ , from  $x_1 = 1$  to  $x_2 = 3$ .
- 14
  - $19/2$
  - 14
  - 16
  - 8
- (16) If  $f(x) = 4 - x$  and  $g(x) = 2x^2 + x + 5$ , What is  $f \circ g(x)$ ?
- $9 + 2x^2 + x$
  - $-1 - 2x^2 - x$
  - $-1 - 2x^2 + x$
  - $2x^2 - 17x + 41$
- (17)  $5^{x-3} = 137$  What is  $x$ ?
- $\frac{\ln 137}{\ln 5}$
  - $\frac{\ln 137}{\ln 5} + 3$
  - $\frac{\ln 5}{\ln 137} + 3$
  - $\frac{\ln 5}{\ln 137}$
- (18) Find out the solution of the system of linear equations in three variable:
- $$\begin{cases} x - 2y + 3z = 22 \\ 2x - 3y - z = 5 \\ 3x + y - 5z = -32 \end{cases}$$
- $(-1, -4, 5)$
  - $(-1, 4, 5)$
  - $(1, 4, -5)$
  - $(1, -4, 5)$
  - $(1, 4, 5)$

- (19) You are taking a test that has five True/False questions. If you answer each question with True or False and leave none of them blank, in how many ways can you answer the whole test?
- (a) 8
  - (b) 64
  - (c) 16
  - (d) 32
  - (e) 30
- (20) A man earns \$10 per hour at his job. The boss gives him a 30% raise. What is his new salary per hour?
- (a) \$3
  - (b) \$13
  - (c) \$10.30
  - (d) \$40
  - (e) None of the above

**For the following questions work the problems in your blue books and show all the work.**

- (21) What is the probability of rolling a 5 before you roll a 7 with a standard pair of dice?
- (22) A swimming pool is twice as long as it is wide and the perimeter is 100 meters. What are the dimensions of the pool.
- (23) A girl has 50 dollars and she is taking a friend to lunch. The tax rate of the meal is 5% and the tip is 15% of the cost of the item. What is the maximum amount that she can spend of the food?
- (24) As student has scores of 85, 96, 72 and 89 on four tests. What is the minimum score that the student must make on the fifth test to have an average of more than 80?