

Math 102 Practice Test #3 Fall 2007

This is a sample of the types of problems that you should expect on the exam.

1. Sketch the graph of $f(x) = 2 - e^{-x}$. Carefully label the asymptote, and any intercepts. *Hint: you can solve for these intercepts algebraically.*

2. Sketch the graph of $g(x) = 1 - \ln(x + 3)$. Carefully label the asymptote, and any intercepts. *Hint: you can solve for these intercepts algebraically.*

3. Write the following as a single logarithm:

$$20 \log_2 (\sqrt[5]{x}) + \log_2 (5x^3) - \log_2 (5)$$

4. Solve $\log_5 (x + 3) = 1 - \log_5 (x - 1)$

5. Solve $2^{x+1} = 5^{1-2x}$

6. a. A population of bacteria obeys the law of uninhibited growth. If 900 bacteria are present initially and there are 1200 after one hour, express the population P as a function of time t .

b. How long will it be until the population doubles? (Write an exact answer.)

7. Solve the following system of linear equations, and write your solution as an ordered pair (x, y) . You can use any method you want!

$$x + 3y = 5$$

$$2x - 3y = -8$$

8. Use a matrix to solve the following system of linear equations. Use row operations to write your matrix in *reduced row echelon form* to obtain the solution. Then write your solution as an ordered triplet (x, y, z) .

$$x + y - z = 6$$

$$3x - 2y + z = -5$$

$$x + 3y - 2z = 14$$

9. Solve the following system of nonlinear equations, and write your solution(s) as ordered pairs (x, y) .

$$x^2 + y^2 = 13$$

$$x^2 - y = 7$$

10. Graph the follow system of linear inequalities:

$$x \geq 0$$

$$y \geq 0$$

$$x + y \geq 2$$

$$x + y \leq 8$$

$$2x + y \leq 10$$

11. A manufacturer produces two models of bicycles. The times (in hours) required for assembling, painting, and packaging each model are shown in the table.

(see Essential Skills page on Chapter 8 for details)

The total times available for assembling, painting, and packaging are 4000 hours, 4800 hours, and 1500 hours, respectively. The profits per unit are \$45 for model A and \$50 for model B. How many of each type should be produced to maximize profit? What is the maximum profit?