

Name \_\_\_\_\_

**BAKER UNIVERSITY**  
**INTERMEDIATE ALGEBRA (MA-140)**  
**PRACTICE TEST 4**

Be sure to **READ** carefully, **SHOW** all work, and **CIRCLE** answers.

GOOD LUCK!

**PART I** (Each problem will be worth 4 points.)

1. Solve by factoring:  $x^2 - 6x - 40 = 0$ .

2. Solve by extracting square roots:  $(x - 3)^2 = 1$ .

3. Solve the equation:  $x^2 = 4x + 5$ .

4. Find the discriminant of the equation  $x^2 + 4x - 5 = 0$ .

5. Solve by using the Quadratic Formula:  $x^2 - 8x + 13 = 0$ .

6. Solve the equation  $x^2 - x - 1 = 0$  and use a calculator to estimate the solutions to two decimal places.

7. Solve the equation:  $x - 4\sqrt{x} + 3 = 0$ .

8. Solve the equation:  $\frac{2}{x} + \frac{1}{x-1} = 2$ .

9. Solve the equation:  $(x+2)(x-3) = 6$ .

10. The solutions to the equation:  $2x^2 + 7x + c = 0$  are  $x = \frac{-7 \pm \sqrt{65}}{4}$ . What is the value of  $c$ ?

**PART II** (Each problem will be worth 6 points.)

1. The length of a rectangle is 3 feet less than twice the width. The area of the rectangle is 54 square feet. Find the dimensions of the rectangle.

2. Determine the values of  $c$  such that the equation

$$3x^2 - 12x + c = 0$$

has one repeated solution.

3. The formula for the number of diagonals  $d$  of a polygon of  $n$  sides is  $d = \frac{n(n-3)}{2}$ .

- (i) Find  $d$  if  $n = 9$ .
- (ii) Find  $n$  if  $d = 9$ .

4. A model rocket is launched upward from a platform 384 feet above the ground. The height  $h$  of the rocket is given at any time  $t$  in seconds by the equation  $h = -16t^2 + 160t + 384$ .

- (i) Find the height if  $t = 5$ .
- (ii) How many seconds does it take until the rocket hits the ground?

5. Solve the system of equations by the method of substitution.

$$\begin{cases} x^2 + 2y = 11 \\ x - y = 2 \end{cases}$$

6. Use the method of elimination to find the value of  $x$  in the solution of the system of equations.

$$\begin{cases} 2x - y = 7 \\ -3x + 2y = -2 \end{cases}$$

7. Use the method of elimination to find the value of  $y$  in the solution of the system of equations.

$$\begin{cases} 2x + y = 4 \\ x - y = -1 \end{cases}$$

8. A bag contains 100 coins, all dimes and quarters. Find the number of dimes and the number of quarters if the value of the coins is \$16.00.

9. A Broadway musical had a paid attendance of 530 people. Mezzanine tickets cost \$9 and orchestra tickets cost \$14. Ticket sales receipts totaled \$5870. How many tickets of each type were sold?

10. Determine the real numbers  $a$  and  $b$  such that  $x = 2$  and  $y = 1$  is a solution to the system of equations

$$\begin{cases} ax + y = 5 \\ x + by = 5. \end{cases}$$

**EXTRA CREDIT:** The perimeter of a triangular piece of land is 12 miles. One leg of the triangle is 1 mile longer than the other leg. Find the length of each boundary of the land if the triangle is a right triangle. [Hint: Use the Pythagorean Theorem.]