

## Sample Exam 3

MAT 1275 Fall 2016

### Part I. Applications of Quadratic Equations.

1. The area of a rectangle is 60 square cm and the perimeter is 34 cm. Find the length and width of the rectangle.
2. Suppose that the length of one leg of a right triangle is 3 inches more than the length of the other leg. If the length of the hypotenuse is 15 inches, find the lengths of the two legs.
3. A right triangle has side lengths represented by three consecutive even integers. Find the lengths of the three sides, measured in meters.

### Part II. Graphs of Quadratic Functions.

1. Graph these equations. Label the coordinates of the vertex and x and y-intercepts (where appropriate), and write the equation of the axis of symmetry.
  - (a)  $y = x^2 + 4x + 5$
  - (b)  $y = \frac{1}{3}x^2 + 5$
  - (c)  $y = (x + 5)^2 - 2$
  - (d)  $y = -2x^2 + 8x + 9$
  - (e)  $y = x^2 + 4x$

### Part III. Distance Formula, Midpoint and Circles

1. Find the radius of a circle with endpoints of a diameter  $(-2, 3)$  and  $(4, 1)$
2. Identify the center and radius of the circle and then graph the circle. Complete the square if necessary.
  - (a)  $(x - 3)^2 + (y + 1)^2 = 16$
  - (b)  $(x + 1)^2 + y^2 = 1$

$$(c) \ x^2 + y^2 + 4x - 8y + 16 = 0$$

$$(d) \ x^2 + y^2 + 10x + 6y + 18 = 0$$

#### Part IV. Systems of Equations.

Solve these systems of equations.

1.

$$\begin{aligned}x + 2y - 3z &= 2 \\ -2x + y + 2z &= 12 \\ 3x - 4y + z &= -24\end{aligned}$$

2.

$$\begin{aligned}-2x + 5y + z &= 8 \\ x - 2y - 3z &= -13 \\ x + 3y - z &= 5\end{aligned}$$

3.

$$\begin{aligned}x^2 + xy &= 7 \\ x + 2y &= 5\end{aligned}$$

4.

$$\begin{aligned}x^2 + y^2 &= 5 \\ x - y^2 &= -3\end{aligned}$$

5.

$$\begin{aligned}3x^2 + 4y^2 &= 16 \\ 2x^2 - 3y^2 &= 5\end{aligned}$$