

MTH 65 – Winter Term 2011  
Test 4 – Given March 9

Name \_\_\_\_\_

<b>You may not use any sort of calculator on this portion of the test.</b>
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1. Solve the equation  $x^2 - 2x - 15 = 0$  using the **zero-product principle**. Make sure that you show steps and organize your work in a manner consistent with that illustrated and discussed in class. (8 points)

2. Solve the equation  $x^2 - 3x - 18 = 0$  using the **quadratic formula**. Make sure that you show steps and organize your work in a manner consistent with that illustrated and discussed in class. Make sure that your solutions are completely simplified. (8 points)

3. Solve the equation  $(z - 4)^2 = 18$  using the square-root property. Make sure that you show steps and organize your work in a manner consistent with that illustrated and discussed in class. Make sure that your solutions are completely simplified. (8 points)

4. Completely simplify each radical expression and write the results in the provide blanks. Perform any necessary calculations in the blank space at the bottom of this page. Make sure that all denominators are rationalized and that all fractions are reduced. (1.5 points each)

a.  $\sqrt{80} =$

\_\_\_\_\_

b.  $-\sqrt{52} =$

\_\_\_\_\_

c.  $\frac{10}{\sqrt{10}} =$

\_\_\_\_\_

d.  $\sqrt{252} =$

\_\_\_\_\_

e.  $\frac{3 \pm \sqrt{18}}{6} =$

\_\_\_\_\_

f.  $\frac{3 \pm \sqrt{12}}{6} =$

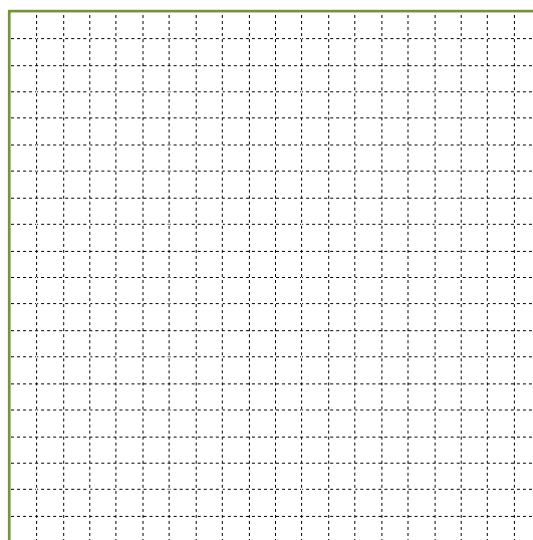
\_\_\_\_\_

5. This entire problem is about the parabola with equation  $y = x^2 - 2x - 8$ .

a. What is the vertex of the parabola? (2 points)

b. Graph the parabola onto Figure 1 after first completing Table 1 with nine ordered pairs centered at the vertex. (8 points)

<b>Table 1:</b> $y = x^2 - 2x - 8$	
$x$	$y$



**Figure 1:**  $y = x^2 - 2x - 8$

c. Provide each bit of information in the provided blanks. (8 points)

The  $x$ -intercepts of the parabola are: \_\_\_\_\_.

The  $y$ -intercept of the parabola is: \_\_\_\_\_.

The axis of symmetry for the parabola is \_\_\_\_\_.

6. What is the vertex of each of the following parabolas? You may do your work on scratch paper and write your result in the provided blank. (4 points)

a. The vertex of the parabola  $y = 2x^2 + 4x - 6$  is \_\_\_\_\_.

b. The vertex of the parabola  $y = x^2 + 6x$  is \_\_\_\_\_.

7. Find the  $x$ -intercepts of each of the following parabolas. **Show all relevant work!** Make sure that your conclusions are clear. (9 points total)

a. Find the  $x$ -intercepts of the parabola  $y = -x^2 + 8x - 12$ .

b. Find the  $x$ -intercepts of the parabola  $y = x^2 + 4x + 8$ .

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1. Solve each equation using any method you darn well please. Make sure that you show steps and organize your work in a manner consistent with that illustrated and discussed in class. Make sure that your solutions are completely simplified. This problem continues on page 2.  
(20 points total)

a. Solve the equation  $6x^2 + 6x + 1 = 0$ .

b. Solve the equation  $x(x - 4) = 21$ .

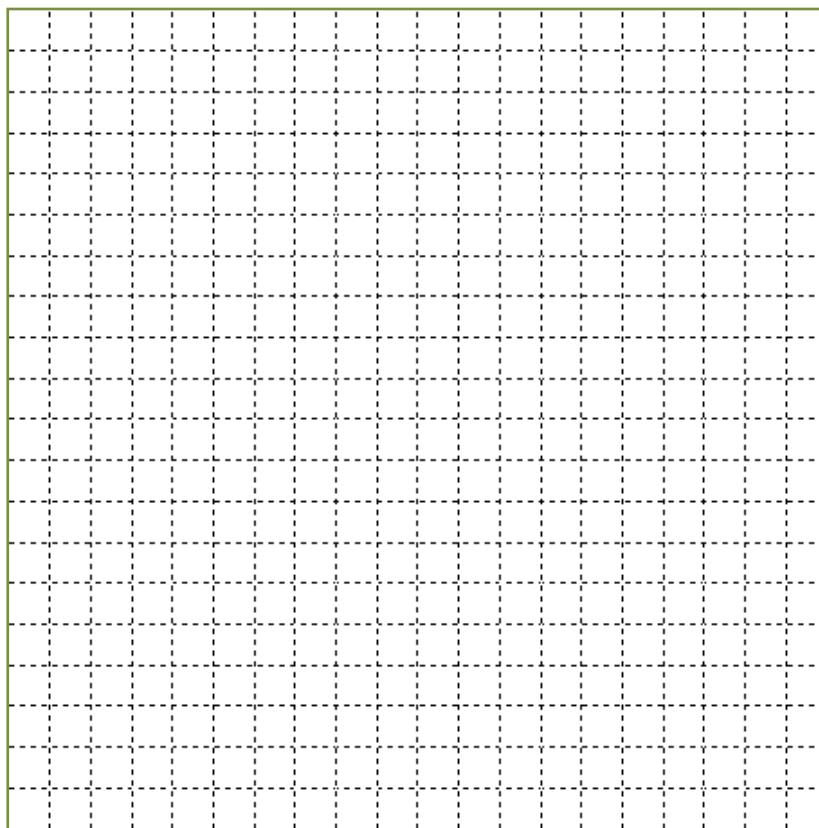
c. Solve the equation  $(2x + 1)^2 - 9 = 40$ .

d. Solve the equation  $4x^2 = 2x - 7$ .

2. Graph the parabola  $y = -2x^2 + 4x + 5$  onto Figure 1 after first completing Table 1 with nine ordered pairs centered at the vertex. Make sure that you fully label all axes after locating the axes in appropriate locations and choosing appropriate scales for each axis. (8 points)

**Table 1:**  $y = -2x^2 + 4x + 5$

$x$	$y$



**Figure 1:**  $y = -2x^2 + 4x + 5$

3. A ball is thrown straight up from a rooftop. The distance between the ball and the ground (measured in feet)  $t$  seconds after the ball is thrown is given by the function  $h(t) = -16t^2 + 20t + 300$ . Determine when the ball is exactly 276 feet above the ground.

Hint: What is it that must equal 276 at that time? (8 points)