

MCF3MI Practice Unit Test 5: Solving Quadratic Equations

Instructions:

Read through the entire test before you begin.

Budget your time carefully - Plan to spend about 1 minute per mark.

Answer the following questions on a separate page. **SHOW ALL YOUR WORK.**

An example marking scheme is shown at the right hand edge of the page. [3] means 3 marks

1. Solve the following quadratic equations by finding  $s$  and  $t$ :

a)  $(x + 3)(x - 5) = 0$  [2]

b)  $2x(x - 3) = 0$  [2]

2. Solve by factoring: [12]

a)  $x^2 + x - 20 = 0$

b)  $x^2 + 12x = -36$

c)  $2x^2 - 9x - 5 = 0$

d)  $x^2 - 5x = -3x + 15$

e)  $5x^2 - 5x = 2x^2 - 15x + 7$

3. Identify the values you would substitute in the quadratic formula to solve the following QE: [3]

$16x^2 + 7 = -24x - 2$

4. Using your result from question 3, solve the above equation. [3]

5. Use the quadratic formula to solve each of the following quadratic equations. Round your answer(s) to 2 decimal places where necessary. State "No Solution" if there are no real roots. [10]

a)  $x^2 - 5x + 11 = 0$

b)  $4x^2 - 44x + 121 = 0$

6. Determine the number of real roots each quadratic equation has. DO NOT SOLVE THE EQUATION. [4]

a)  $x^2 + 3x - 4 = 0$

b)  $3(x + 5)^2 + 7 = 0$

7. On Mars, if you hit a baseball, the height  $h$  after  $t$  seconds would be given by:  $h(t) = -2t^2 + 20t + 1$  [7]

a) What is the maximum height reached by the ball? (Round your answer to the nearest 0.1m)

b) When does the ball hit the ground? (Round your answer to the nearest 0.1 second.)

8. The product of two consecutive NEGATIVE integers is 1122. Find the integers. [3]

9. Graph the functions from #1 and #6 using the step pattern and vertex. [16]

Solutions:

1a)  $x = -3, 5$

1b)  $x = 0, 3$

2a)  $x = -5, 4$

2b)  $x = -6$

2c)  $x = -\frac{1}{2}, 5$

2d)  $x = -3, 5$

2e)  $x = 1, \frac{7}{3}$

3.  $a = 16, b = 24, c = 9$

4.  $x = -\frac{3}{4}$

5a) no solution

5b)  $x = \frac{11}{2}$

6a) two roots

6b) no real roots

7a)  $h = 51\text{m}$

7b)  $t = 10.1\text{sec}$

8. -34, -33