**MATH 115 QUIZ 2 July**, 2017 Instructor: I. Izmirli

**NAME:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

I have completed this assignment myself, working independently and not consulting anyone except the instructor.

**INSTRUCTIONS**

* The quiz is worth 100 points. There are 10 problems.
* Each problem is worth 10 points
* This quiz is ***open book*** and ***open notes***. This means that you may refer to your textbook, notes, and online classroom materials, but ***you must work independently and may not consult anyone*** (and confirm this with your submission). You may take as much time as you wish, provided you turn in your quiz no later than **Sunday, July 9**.
* **Show work/explanation. Answers without any work may earn little, if any, credit.** You may type or write your work in your copy of the quiz, or if you prefer, create a document containing your work. Scanned work is acceptable also. **In your document, be sure to include your name and the assertion of independence of work.**
* General quiz tips and instructions for submitting work are posted in the Quizzes module.
* If you have any questions, please contact me by e-mail.

1. Which of the following equations does the graph represent?

|  |  |
| --- | --- |
| A.  B.  C.  D. | q3LinesOL2.gif |

2. Consider the points (– 2, 1) and (4, -3).

(a) Find the **slope-intercept equation** of the line passing through the two given points. **Show work.**

(b) **Graph** the line you found in (a).

3. Find the equation of the line that passes through the point (1, 1) and is perpendicular to the line you obtained in problem 2

4. The amount of gas *g* in gallons in a car's gas tank *t* days after a fill-up is modeled by *g*(*t*) = –0.5*t*2 – 1.5*t* + 20 for 0 ≤ *t* ≤ 4.

*Find*  and *interpret* the average rate of change of *g* over the interval [0, 4].

5. Look at the graph of the quadratic function and complete the table.

|  |  |  |
| --- | --- | --- |
| **Graph** | **Fill in the blanks** | **Equation** |
| quadupgrid.png | (a) State thevertex:  \_\_\_\_\_\_\_\_\_\_\_\_  (b) State therange:  \_\_\_\_\_\_\_\_\_\_\_\_\_  (c) State the interval on which the function is increasing:  \_\_\_\_\_\_\_\_\_\_\_\_\_ | (d) The graph represents which of the following equations?  **Choice:\_\_\_\_**  A. *y* = –*x*2 + 4*x* – 3  B. *y* = –2*x*2 – *x* + 3  C. *y* = *x*2 – 2*x* – 3  D. *y* = *x*2 + 2*x* – 3 |

6. Look at the graph of the polynomial function and complete the table.

|  |  |
| --- | --- |
| **Graph** | **Fill in the blanks** |
| exam2quartic2.gif | (a) State the *y*-intercept: \_\_\_\_\_\_\_­­­­­­\_\_\_\_\_\_\_\_\_  (b) State thereal-number zeros:  \_\_\_\_\_\_\_­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_  (c) Is the degree of the polynomial **odd** or **even**? (choose one)  (d) Is the leading coefficient of the polynomial **positive** or **negative**? (choose one)  (e) The graph represents which of the following polynomials, shown in factored form? **Choice:\_\_\_\_**  A. *f* (*x*) = – 0.2(*x* + 3)(*x* + 1)(*x* – 2)(*x* –5)  B. *f* (*x*) = 0.2(*x* + 3)(*x* + 1)(*x* – 2)(*x* –5)  C. *f* (*x*) = – 0.2(*x* –3)(*x* – 1)(*x* + 2)(*x* + 5)  D. *f* (*x*) = 0.03(*x* – 6)(*x* –3)(*x* – 1)(*x* + 2)(*x* + 5) |

7. Solve the inequality *x*2 ≥ 3*x* and write the solution set in interval notation.

A. (–∞, 3]

B. (–∞, 0] ∪ [3, ∞)

C. (–∞, 3] ∪ [0, ∞)

D. [0, 3]

8. For *f* (*x*) = *x*3 – *x*2 – 2, use the Intermediate Value Theorem to determine which interval must contain a zero of *f*.

A. Between 0 and 1

B. Between 1 and 2

C. Between 2 and 3

D. Between 3 and 4

9. For *z* = 4 + 3*i* and *w* = 5 - 2*i*, find *zw*. That is, determine (4 + 3*i*) (5 - 2*i*) and simplify as much as possible, writing the result in the form *a* + *bi*, where *a* and *b* are real numbers.

10. For *z* = 8 + 3*i* and *w* = 7 + 2*i*, find . That is, determine (8 + 3*i*) / (7 + 2*i*) and simplify as much as possible, writing the result in the form *a* + *bi*, where *a* and *b* are real numbers.

11. (8 pts) Consider the equation 5*x*2 + 1 = 2*x*. Find the complex solutions (real and non-real) of the equation, and simplify as much as possible. **Show algebraic work.**

13. (18 pts)

The cost, in dollars, for a company to produce *x* widgets is given by *C*(*x*) = 5000 + 3.00*x* for

*x* ≥ 0, and the price-demand function, in dollars per widget, is *p*(*x*) = 28 − 0.02*x* for 0 ≤ *x* ≤ 1400.

In Quiz 1, problem #9(d), we saw that the profit function for this scenario is

*P*(*x*) = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. (fill in with the profit function given in the Quiz 1 solutions)

(a) The profit function is a quadratic function and so its graph is a parabola.

Does the parabola open up or down? \_\_\_\_\_\_\_\_\_\_

(b) Find the vertex of the profit function *P*(*x*) using algebra. **Show algebraic work**.

(c) State the maximum profit and the number of widgets which yield that maximum profit:

The maximum profit is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ when \_\_\_\_\_\_\_\_\_\_\_\_ widgets are produced and sold.

(d) Determine the price to charge per widget in order to maximize profit.

(e) Find and interpret the break-even points. **Show algebraic work.**