Math II: 1st Semester Final Midpoint Test

Unit 1: Extending the Number System

1. Circle all the subsets that would describe the following number (8 points):
   -35

Complex	Natural
Integers	Rational
Irrational	Real
Whole	Prime

2. Using the Properties of Exponents simplify the following expressions (2 points).
   A. $-2x^8y^{-3} \cdot 3y^{-1} \cdot 5y^7x^{-5}$

3. Rewrite the following radical using rational exponents (2 points):
   $\sqrt[7]{4x^2}$

4. Rewrite the following rational exponent expression in radical form (2 points):
   $(x^3y^5)^{\frac{7}{4}}$

5. Write an equation that represents each of the following scenarios (2 points each = 8 points total):

The marketing class is selling n shirts for $15 each. They invested $1000 to purchase the shirts and have made a profit of p(n).
The initial population of bacteria is 375 micrometers. The population will quadruple every 30 minutes.
The amount in the Hoopeston Education Associations checking account, A, has $20,000 in it. The Association saves $600 yearly for y years
The initial population of bacteria is 30 micrometers. The population will cut in half every 2 hours after the initial dose of medication is taken.

Unit 2A: Quadratic Functions – Representations

6. Find the sum (2 points).

$$(-7x - 3x^3 + 10x^2) + (-9 + x^2 - 5x^3)$$

7. Find the difference (2 points).

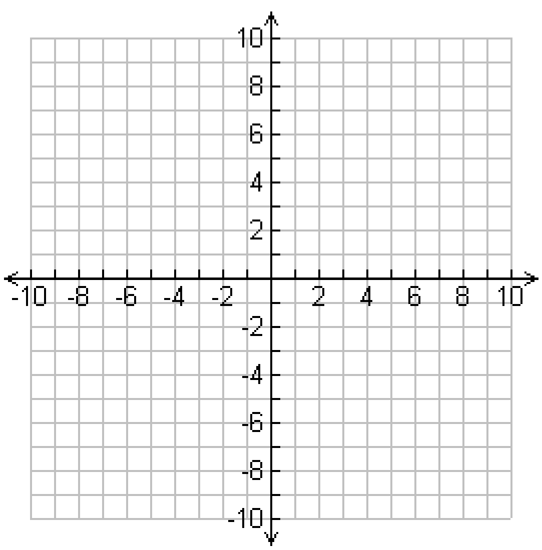
$$(-7x - 3x^3 + 10x^2) - (-9 + x^2 - 5x^3)$$

8. 8. Graph each of the following functions:

$$f(x) = x^2 + 3x + 2$$

A. Find the Axis of Symmetry (2 points):

B. Create a Table of Values & graph (2 pts):



C. Identify the Vertex of the function (2 pts):

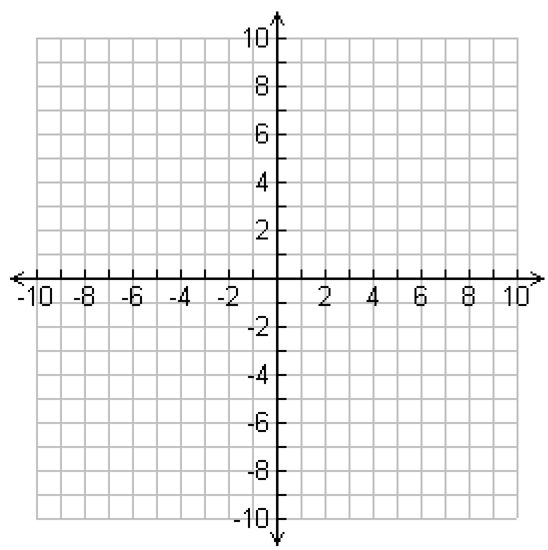
D. Identify the y-intercept of the function (2pts):

E. Identify the x-intercept of the function (2pts):

$$f(x) = -2x^2 + 8x - 2$$

A. Find the Axis of Symmetry (2 points):

B. Create a Table of Values & graph (2 pts):



C. Identify the Vertex of the function (2 pts):

D. Identify the y-intercept of the function (2pts):

E. Identify the x-intercept of the function (2pts):

Unit 2B: Quadratic Functions – Modeling

9. Write an equation for each of the following scenarios (2 points each = 8 points total):

A. Khloe is on top of a bridge overlooking the river and asks if she can throw a rock over the side. She throws the rock upward at 42 feet per second from a height of 150 feet	
B. Mr. Brewer wants to put a little garden in the back yard for the kids. To keep the animals out of it they want to fence the garden in. At the moment they have a patch of land in mind that is 55 feet by 500 feet.	
C. A construction crew is building another sky scraper in New York and has a guy 3500 feet above ground. He is chewing a piece of gum that is old and throws it down at 25 feet per second.	
D. Bryson and Khloe want to create a lemonade stand to help support another little girl that they know who shares the same heart condition as Khloe does. They are currently selling lemonade for $0.50 a cup and are selling 200 cups per day. If they increase their sales by increments of $0.25 they think they will only lose 15 customers per increase since it is for such a good cause.	

10. For each of the following functions state if the vertex would be a **MAXIMUM** or a **MINIMUM** (1 point each):

A. $A(x) = -3x^2 + 12x + 50$	B. $C(r) = 3r^2 - 2r + 140$

Unit 2C: Quadratic Functions – Working with Equations

11. Simplify the following square roots (2 points each).

A. $\sqrt{1053}$	B. $\sqrt{-539}$

12. Perform the indicated operation on the Complex Numbers (2 points each):

A. $(-3+2i)+(7-5i)$	B. $(9-8i)-(-3+7i)$
C. $(3-5i)(7+2i)$	D. $\dfrac{-4-7i}{3+4i}$

13. Solve the following Quadratic equations using any method of your choosing (2 points each).

A. $-2x=-35+x^2$	B. $-42x+9=-49x^2$