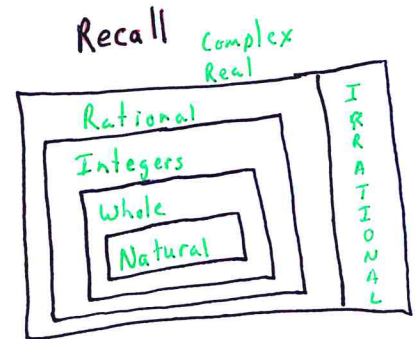


Math II: 1st Semester Final Midpoint Test

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. $-2x^8y^{-3} \cdot 3y^{-1} \cdot 5y^7x^{-5}$

$-2(3)(5) x^{8-5} y^{-3-1+7}$

$-30x^3y^3$

3. Rewrite the following radical using rational exponents (2 points):

Root $-\sqrt[7]{4x^2}$ same as $\sqrt[7]{(4x^2)^1}$ giving $(4x^2)^{1/7}$

Power
Root

4. Rewrite the following rational exponent expression in radical form (2 points):

$(x^3y^5)^{7/4}$

Power
Root

$\sqrt[4]{(x^3y^5)^7}$

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

<p>The marketing class is selling n shirts for \$15 each. They invested \$1000 to purchase the shirts and have made a profit of $p(n)$.</p> <p>Form: Linear $y = mx + b$</p> <p>$p(n) = 15n - 1000$</p>	
<p>The initial population of bacteria is 375 micrometers. The population will quadruple every 30 minutes.</p> <p>Form: Exponential $y = ab^x$</p> <p>$p = 375(4)^{2t}$</p>	<p>$\frac{2 \text{ sets } 30 \text{ min}}{1 \text{ hr}}$</p>
<p>The amount in the Hoopston Education Associations checking account, A, has \$20,000 in it. The Association saves \$600 yearly for y years</p> <p>Form: Linear $y = mx + b$</p> <p>$A = 600y + 20000$</p>	
<p>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.</p> <p>Form: Exponential $y = ab^x$</p> <p>$p = 30\left(\frac{1}{2}\right)^{\frac{1}{2}t}$ or $p = 30\left(\frac{1}{2}\right)^{\frac{t}{2}}$</p>	

Unit 2A: Quadratic Functions – Representations

6. Find the sum (2 points).

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

$$\underline{-7x} - \underline{3x^3} + \underline{10x^2} \quad \underline{-9} + \underline{x^2} - \underline{5x^3}$$

Dropped (); underline like terms.

$$\boxed{-8x^3 + 11x^2 - 7x - 9}$$

Standard Form:

7. Find the difference (2 points).

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

$$\underline{-7x} - \underline{3x^3} + \underline{10x^2} \quad \underline{+9} - \underline{x^2} + \underline{5x^3}$$

Change signs of all terms in second set of ().
underline like terms.

$$\boxed{2x^3 + 9x^2 - 7x + 9}$$

Standard Form

8. 8. Graph each of the following functions:

$a=1$
 $b=3$
 $c=2$

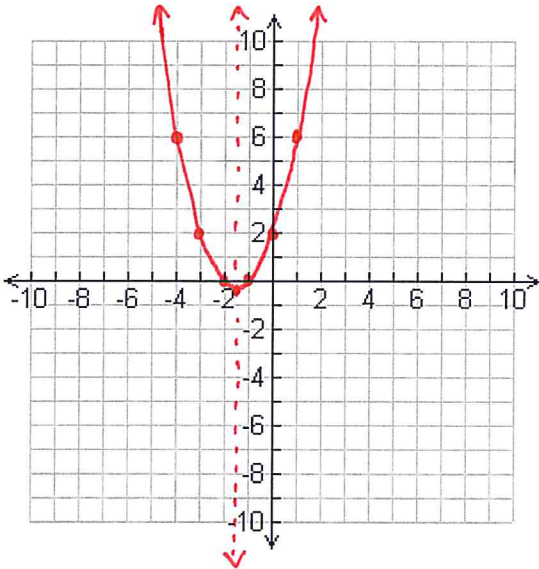
$$f(x) = x^2 + 3x + 2$$

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

$$X = \frac{-b}{2a} = \frac{-3}{2(1)} = \frac{-3}{2} = -1.5$$

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

X	$f(x) = x^2 + 3x + 2$	$(x, f(x))$
-4	$(-4)^2 + 3(-4) + 2$	$(-4, 6)$
-3	$(-3)^2 + 3(-3) + 2$	$(-3, 2)$
-2	$(-2)^2 + 3(-2) + 2$	$(-2, 0)$
-1.5	$(-1.5)^2 + 3(-1.5) + 2$	$(-1.5, -0.25)$
-1	$(-1)^2 + 3(-1) + 2$	$(-1, 0)$
0	$(0)^2 + 3(0) + 2$	$(0, 2)$
1	$(1)^2 + 3(1) + 2$	$(1, 6)$



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

Middle pt of chart $(-1.5, -0.25)$

D. Identify the y-intercept of the function (2pts): The pt $(0, c)$ so $(0, 2)$

E. Identify the x-intercept of the function (2pts): Pts $(#, 0)$ so $(-2, 0)$ & $(-1, 0)$

$a=-2$
 $b=8$
 $c=-2$

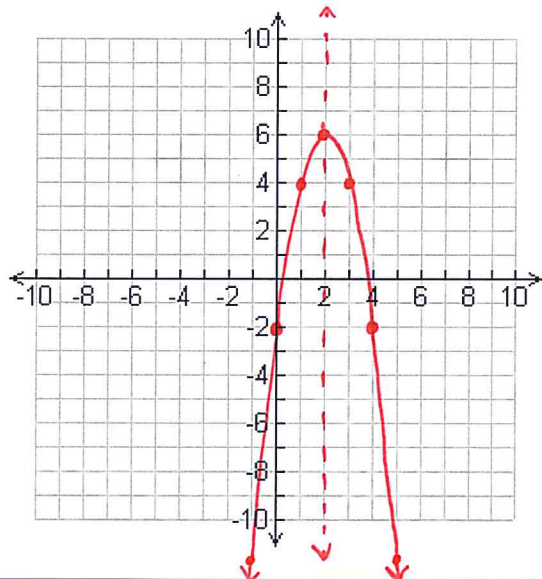
$$f(x) = -2x^2 + 8x - 2$$

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

$$X = \frac{-b}{2a} = \frac{-8}{2(-2)} = \frac{-8}{-4} = 2$$

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

X	$f(x) = -2x^2 + 8x - 2$	$(x, f(x))$
-1	$-2(-1)^2 + 8(-1) - 2$	$(-1, -12)$
0	$-2(0)^2 + 8(0) - 2$	$(0, -2)$
1	$-2(1)^2 + 8(1) - 2$	$(1, 4)$
2	$-2(2)^2 + 8(2) - 2$	$(2, 6)$
3	$-2(3)^2 + 8(3) - 2$	$(3, 4)$
4	$-2(4)^2 + 8(4) - 2$	$(4, -2)$
5	$-2(5)^2 + 8(5) - 2$	$(5, -12)$



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

Middle pt of chart $(2, 6)$

D. Identify the y-intercept of the function (2pts): The pt $(0, c)$ so $(0, -2)$

E. Identify the x-intercept of the function (2pts): These are between look for y value to change signs $0 < x < 1$ & $3 < x < 4$

$2 \pm \sqrt{3}$
 $\frac{-8 \pm 4\sqrt{3}}{-4}$
 $\frac{-8 \pm \sqrt{16 \cdot 3}}{-4}$
 $\frac{-8 \pm \sqrt{48}}{-4}$

OR $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-8 \pm \sqrt{(8)^2 - 4(-2)(-2)}}{2(-2)} = \frac{-8 \pm \sqrt{48}}{-4}$

Unit 2B: Quadratic Functions – Modeling

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

<p>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</p>	<p>General Form: $h(t) = -16t^2 + v_0t + h_0$</p> $h(t) = -16t^2 + 42t + 150$
<p>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.</p>	<p>General Form: $A(x) = (L-x)(w+x)$</p> $A(x) = (500-x)(55+x)$
<p>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.</p>	<p>General Form: $h(t) = -16t^2 + v_0t + h_0$</p> $h(t) = -16t^2 - 25t + 3500$
<p>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.</p>	<p>General Form: $C(r) = (p+dr)(s+Lr)$</p> $C(r) = (0.50 + 0.25r)(200 - 15r)$

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

<p>A. $A(x) = -3x^2 + 12x + 50$ Since value of a is -3,</p> Maximum	<p>B. $C(r) = 3r^2 - 2r + 140$ Since value of a is 3,</p> Minimum
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