Name: KEY Class: _____ Date: _____ ID: A

Chapter 10 Practice Test

Short Answer

1. Order the group of quadratic functions from widest to narrowest graph. $y = 1\frac{1}{3}x^2$

   a. $y = -7x^2, y = -\frac{1}{5}x^2, y = -\frac{1}{3}x^2$

   Widest: $y = -\frac{1}{5}x^2$

   Middle: $y = -\frac{1}{3}x^2$

   Narrowest: $y = -7x^2$

   b. $y = \frac{2}{3}x^2, y = -2x^2, y = \frac{4}{3}x^2$

   Widest: $y = \frac{2}{3}x^2$

   Middle: $y = \frac{4}{3}x^2$

   Narrowest: $y = -2x^2$

2. What is the equation for the axis of symmetry?

   $x = \frac{-b}{2a}$

3. What is the expression for evaluating the discriminant?

   $b^2 - 4ac$

4. What is the Quadratic Formula?

   $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

5. Find the equation of the axis of symmetry and the coordinates of the vertex of the graph of the function. Show your work below the problem.

   a. $y = 2x^2 + 4x - 3$

   a = 2, b = 4, c = -3 AOS: $x = -1$ Vertex: $(-1, -5)$

   $x = \frac{-4}{2(2)} = \frac{-4}{4} = -1$

   $y = 2(-1)^2 + 4(-1) - 3$

   $= 2 - 4 - 3$

   $y = -5$

   b. $y = -x^2 + 6x - 1$

   a = -1, b = 6, c = -1 AOS: $x = 3$ Vertex: $(3, 8)$

   $x = \frac{-6}{2(-1)} = \frac{-6}{-2} = 3$

   $y = -(3)^2 + 6(3) - 1$

   $= -9 + 18 - 1$

   $y = 8$

Name: _____ ID: A

6. Fill in the following information. Then graph the parabola. Label the axis of symmetry and vertex on the graph.

a. $y = -x^2 + 4x - 4$

a = −1, b = 4, c = −4

Opens? UP or (Down)

Wide or (Narrow)?

Y-Int.: $c = -4$

Axis of Symmetry: $x = \frac{-4}{2(-1)} = \frac{-4}{-2}$, $x = 2$

Vertex: $V(2, 0)$

Discrim.: $(4)^2 - 4(-1)(-4)$, $16 - 16$, 0

Roots: 1 root

$y = -(2)^2 + 4(2) - 4$

$= -4 + 8 - 4$

$y = 0$

Reasonable Table:

x	y
0	−4
1	−1
2	0
3	−1
4	−4

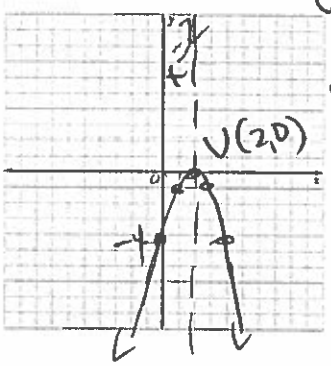
Solve for Roots:

$x = \frac{-4 \pm \sqrt{(4)^2 - 4(-1)(-4}}{2(-1)}$

$= \frac{-4 \pm \sqrt{16 - 16}}{-2} = \frac{-4 \pm 0}{-2}$

$x = \frac{-4 \pm 0}{-2} = \frac{-4}{-2} = 2$

$x = 2$



b. $f(x) = 2x^2 + 4x - 3$

a = 2, b = 4, c = −3

Opens? (UP) or Down

Wide or (Narrow)?

Y-Int.: $c = -3$

Axis of Symmetry: $x = \frac{-4}{2(2)} = \frac{-4}{4} = -1$

Vertex: $V(-1, -5)$

Discrim.: $(4)^2 - 4(2)(-3)$, $16 + 24$, $+40$

Roots: 2 roots

$y = 2(-1)^2 + 4(-1) - 3$

$= 2 - 4 - 3$

$y = -5$

Reasonable Table:

x	y
−3	3
−2	−3
−1	−5
0	−3
1	3

Solve for Roots:

$x = \frac{-4 \pm \sqrt{(4)^2 - 4(2)(-3)}}{2(2)}$

$= \frac{-4 \pm \sqrt{40}}{4}$

$= \frac{-4 \pm 6.32}{4}$

$\frac{-4 + 6.32}{4}$

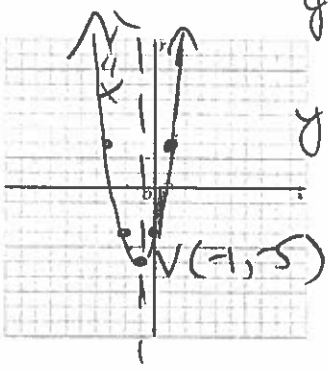
$\frac{2.32}{4}$

0.58

$\frac{-4 - 6.32}{4}$

$\frac{-10.32}{4}$

-2.58



Name: _____ ID: A

Solve the equation using square roots.

7. a. $3x^2 - 27 = 0$

$3x^2 = 27$

$x^2 = \pm 9$

$x = \pm 3$

b. $x^2 - 15 = 38$

$+15 \quad +15$

$\sqrt{x^2} = \sqrt{53}$

$x = \pm 7.28$

Solve the equation using whatever method you wish.

8. a. $z^2 + 9z + 18 = 0$

$(z+3)(z+6) = 0$

$z+3=0 \quad z+6=0$

$z=-3 \quad z=-6$

b. $x^2 + 3x - 18 = 0$

$(x+6)(x-3) = 0$

$x+6=0 \quad x-3=0$

$x=-6 \quad x=3$

$x = \frac{-3 \pm \sqrt{9-4(1)(-18)}}{2(1)}$

$= \frac{-3 \pm \sqrt{9+72}}{2} = \frac{-3 \pm \sqrt{81}}{2}$

$= \frac{-3 \pm 9}{2} \begin{cases} \frac{6}{2} = 3 \\ \frac{-12}{2} = -6 \end{cases}$

9. a. $c^2 - 2c = 0$

$c^2 - 2c + 0 = 0$

$c(c-2) = 0$

$c=0 \quad c=2$

$= \frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(0)}}{2(1)} = \frac{2 \pm \sqrt{4-0}}{2}$

$\frac{2 \pm 2}{2} \begin{cases} \frac{4}{2} = 2 \\ \frac{0}{2} = 0 \end{cases}$

b. $2x^2 - 10x = 0$

$2x^2 - 10x + 0 = 0$

$2x(x-5) = 0$

$2x=0 \quad x-5=0$

$x=0 \quad x=5$

$x = \frac{-(-10) \pm \sqrt{(-10)^2 - 4(2)(0)}}{2(2)}$

$= \frac{10 \pm \sqrt{100-0}}{4} = \frac{10 \pm \sqrt{100}}{4}$

$= \frac{10 \pm 10}{4} \begin{cases} \frac{20}{4} = 5 \\ \frac{0}{4} = 0 \end{cases}$

Use the quadratic formula to solve the equation. If necessary, round to the nearest hundredth.

10. a. $-3y^2 + 9y = -12$

$a=-3$

$b=9$

$c=12$

$-3y^2 + 9y + 12 = 0$

$y = \frac{-9 \pm \sqrt{81-4(-3)(12)}}{2(-3)} = \frac{-9 \pm \sqrt{81+144}}{-6}$

$= \frac{-9 \pm \sqrt{225}}{-6} = \frac{-9 \pm 15}{-6} \begin{cases} \frac{-9-15}{-6} = \frac{-24}{-6} = 4 \\ \frac{-9+15}{-6} = \frac{6}{-6} = -1 \end{cases}$

$x = \{1, 4\}$

b. $5x^2 - 6x = 1$

$5x^2 - 6x - 1 = 0$

$x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(5)(-1)}}{2(5)}$

$= \frac{6 \pm \sqrt{36+20}}{10} = \frac{6 \pm \sqrt{56}}{10} = \frac{6 \pm 7.48}{10}$

$\frac{6+7.48}{10} = \frac{13.48}{10} = 1.348$

$\frac{6-7.48}{10} = \frac{-1.48}{10} = -0.148$

$x = \{-0.15, 1.35\}$

Name: _____ ID: A

Using the discriminant, find the number of real number solutions for the equation.

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

$a=1$ $b=-2$ $c=5$

b^2-4ac

$(-2)^2-4(1)(5)$

$4-20$

-16 — 0 roots

b. $x^2 - 7x + 5 = 0$

$a=1$ $b=-7$ $c=5$

b^2-4ac

$(-7)^2-4(1)(5)$

$49-20$

$+29$ — 2 roots

Other

12. **Label each eqaution with what you think is the easiest method to use for solving and EXPLAIN why. (CHOICES: Solving by Square Roots, Factoring, or Quadratic Formula).**

a.) $4x^2 = 64$ Square Roots — no "b" term

b.) $x^2 + 11x + 24 = 0$ Factoring — factors easily

$(x+3)(x+8)=0$

c.) $x^2 + 7x - 2 = 0$ Quadratic Formula — doesn't factor