

Name: Key

Unit 2 Review – Quadratics

Helpful Information:

Types of Factoring:

- ❖ GCF
- ❖ Difference of Two Squares
- ❖ Trinomial (regular & grouping)

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

Standard Form: $y = ax^2 + bx + c$

Vertex Form: $y = \frac{1}{4p}(x - h)^2 + k$

where, p = distance from focus to vertex and vertex to directrix, and (h,k) represents the vertex

Completing the Square:

Procedure.

1. Isolate the constant term & divide by the leading coefficient
2. Side Work:
 - > multiply 1/2 by the coefficient of x
 - > square the result and add it to both sides
3. Simplify the right & Factor the left (x + answer from 2a)²
4. Take the square root of both sides (remember ± on side w/out variable)
5. Solve for x & simplify if necessary

Nature of Roots:

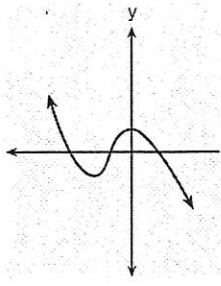
determined by discriminant $b^2 - 4ac$

Level I Practice:

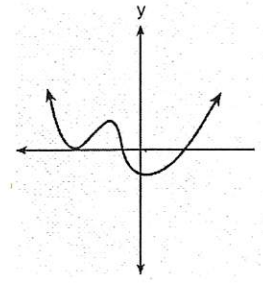
1. Which graph has the following characteristics?

- three real zeros
- as $x \rightarrow -\infty, f(x) \rightarrow -\infty$
- as $x \rightarrow \infty, f(x) \rightarrow \infty$

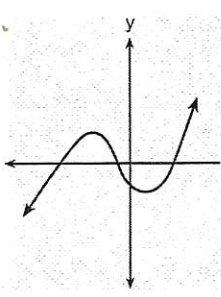
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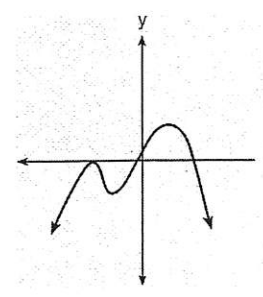
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3



4



2. The zeros for $f(x) = x^4 - 4x^3 - 9x^2 + 36x$ are

- 1) $\{0, \pm 3, 4\}$
- 2) $\{0, 3, 4\}$
- 3) $\{0, \pm 3, -4\}$
- 4) $\{0, 3, -4\}$

factored by grouping

$$x(x^3 - 4x^2 - 9x + 36)$$

$$x[x^2(x-4) - 9(x-4)]$$

$$x(x-4)(x^2-9)$$

$$x(x-4)(x-3)(x+3)$$

$x=0 \quad x=4 \quad x=3 \quad x=-3$

3. The directrix of the parabola $12(y+3) = (x-4)^2$ has the equation $y = -6$. Find the coordinates of the focus of the parabola.

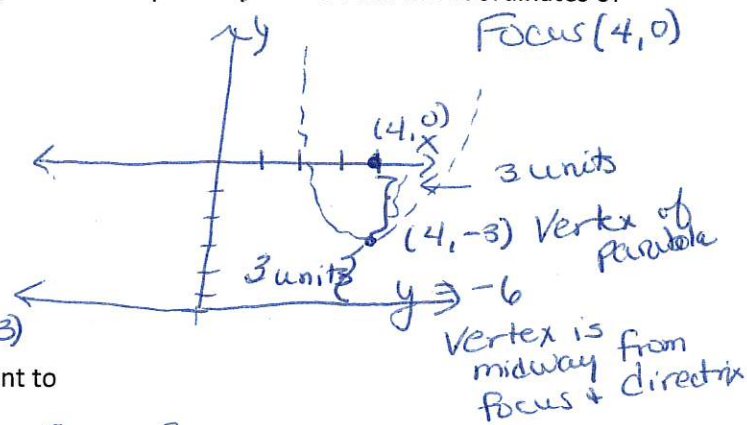
$$\frac{12(y+3)}{12} = \frac{(x-4)^2}{12}$$

$$y+3 = \frac{1}{12}(x-4)^2$$

$$\frac{-3}{-3} = \frac{-3}{-3}$$

$$y = \frac{1}{12}(x-4)^2 - 3$$

Vertex $(4, -3)$



4. Factored completely, $m^5 + m^3 - 6m$ is equivalent to

- 1) $(m+3)(m-2)$
- 2) $(m^2+3m)(m^2-2)$
- 3) $m(m^4+m^2-6)$
- 4) $m(m^2+3)(m^2-2)$

$$m^5 + m^3 - 6m$$

$$m(m^4 + m^2 - 6)$$

$$m(m^2 + 3)(m^2 - 2)$$

5. The solution to the equation $18x^2 - 24x + 87 = 0$ is $a=18 \quad b=-24 \quad c=87$

- 1) $-\frac{2}{3} \pm 6i\sqrt{158}$
- 2) $-\frac{2}{3} \pm \frac{1}{6}i\sqrt{158}$
- 3) $\frac{2}{3} \pm 6i\sqrt{158}$
- 4) $\frac{2}{3} \pm \frac{1}{6}i\sqrt{158}$

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

$$\frac{24 \pm \sqrt{(-24)^2 - 4(18)(87)}}{2(18)}$$

$$\frac{24 \pm \sqrt{-5688}}{36} = \frac{24 \pm \sqrt{-1 \cdot 36 \cdot 158}}{36}$$

$$= \frac{24 \pm 6i\sqrt{158}}{36} = \frac{24}{36} \pm \frac{6}{36}i\sqrt{158}$$

$$\frac{2}{3} \pm \frac{1}{6}i\sqrt{158}$$

Level II Practice:

6. A solution of the equation $2x^2 + 3x + 2 = 0$ is $a=2$ $b=3$ $c=2$

- Look carefully at the choices
- 1) $-\frac{3}{4} + \frac{1}{4}i\sqrt{7}$
 - 2) $-\frac{3}{4} + \frac{1}{4}i$
 - 3) $-\frac{3}{4} + \frac{1}{4}\sqrt{7}$
 - 4) $\frac{1}{2}$

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

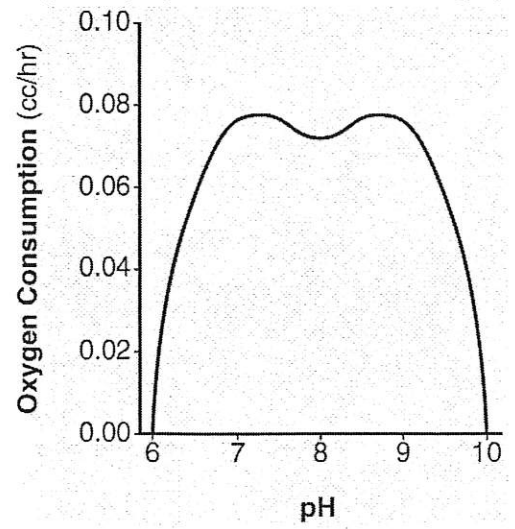
$$= \frac{-3 \pm \sqrt{3^2 - 4(2)(2)}}{2(2)}$$

$$= \frac{-3 \pm \sqrt{9 - 16}}{4} = \frac{-3 \pm \sqrt{-7}}{4}$$

$$= \frac{-3 \pm i\sqrt{7}}{4} = -\frac{3}{4} \pm \frac{1}{4}i\sqrt{7}$$

Solutions $\left\{ -\frac{3}{4} + \frac{1}{4}i\sqrt{7}, -\frac{3}{4} - \frac{1}{4}i\sqrt{7} \right\}$

7. There was a study done on oxygen consumption of snails as a function of pH, and the result was a degree 4 polynomial function whose graph is shown below.



Which statement about this function is incorrect?

- 1) The degree of the polynomial is even.
- 2) There is a positive leading coefficient. *c of (-1)*
- 3) At two pH values, there is a relative maximum value. *c (7.5 @ pH = 7, 9.5 @ pH = 9)*
- 4) There are two intervals where the function is decreasing. *c*

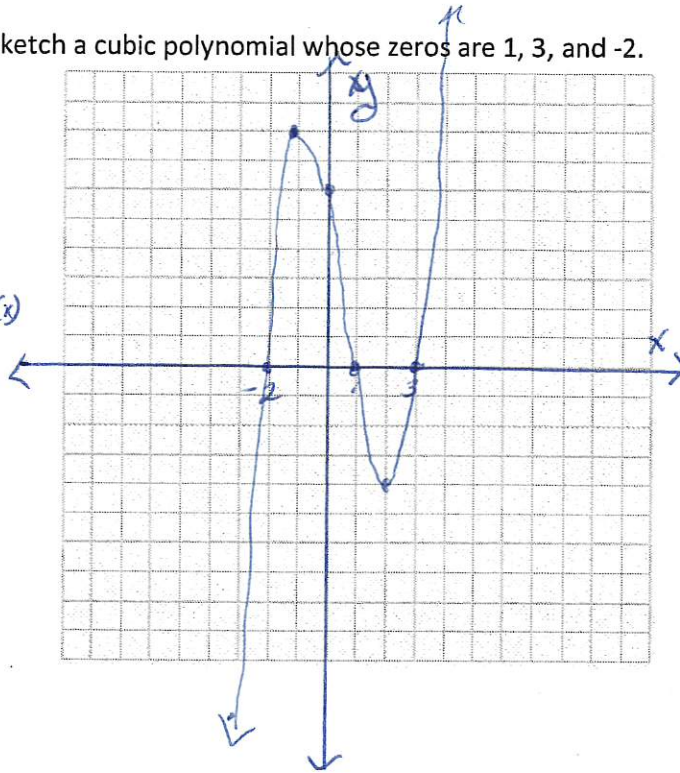
8. On the grid below, sketch a cubic polynomial whose zeros are 1, 3, and -2.

Zeros
 $x=1, x=3, x=-2$

$(x-1)(x-3)(x+2) = f(x)$
 are factors.

On calc, a table.

x	f(x)
-3	-24
-2	0
-1	8
0	6
1	0
2	-4
3	0
4	18



Level III Practice:

10. The equation $4x^2 - 24x + 4y^2 + 72y = 76$ is equivalent to

- 1) $4(x-3)^2 + 4(y+9)^2 = 76$
 - 2) $4(x-3)^2 + 4(y+9)^2 = 121$
 - 3) $4(x-3)^2 + 4(y+9)^2 = 166$
 - ④ $4(x-3)^2 + 4(y+9)^2 = 436$
- $4x^2 - 24x + \underline{\quad} + 4y^2 + 72y + \underline{\quad} = +76$
 $4(x^2 - 6x + \underline{9}) + 4(y^2 + 18y + \underline{81}) = +76 + 4(9+81)$
 $4(x-3)^2 + 4(y+9)^2 = +76 + 360$
 $4(x-3)^2 + 4(y+9)^2 = 436$

11. Algebraically determine the values of h and k to correctly complete the identity stated below.

$$2x^3 - 10x^2 + 11x - 7 = (x-4)(2x^2 + hx + 3) + k$$

$$x-4 \overline{) 2x^3 - 10x^2 + 11x - 7}$$

$$\underline{-2x^3 + 8x^2} $$

$$ \underline{-2x^2 + 11x} $$

$$ \underline{+2x^2 + 8x} $$

$$ \underline{3x - 7}$$

$$ \underline{-3x + 12}$$

$$ \underline{5}$$

$$h = -2$$

$$k = 5$$