MCR3U - Unit 1 Test

Question Sheet

Name: _____ **Mark:** _____ **/ 30**

K&U	A	T	C
_____ / 9	_____ / 10	_____ / 5	_____ / 6

Section I

Part A: Knowledge - Fill in Blanks (6 marks, 1 mark per each)

- Please **show your work**.

Given the quadratic function $f(x) = \frac{1}{2}(x + 1)^2 - 2$, determine the:

1. vertex: _____
2. axis of symmetry: _____
3. y-intercept(s): _____
4. x-intercept(s): _____
5. maximum or minimum value: _____

Part B: Knowledge - Multiple Choices (3 marks, 1 mark per each)

- Identify the choice that **best** answers the question.

6. Which of the following is the name of the parent function of the $g(x) = \frac{1}{2(x-1)}$?

   A. linear function
   B. absolute value funciton
   C. quadratic function
   D. reciprocal function

7. Which of the following functions does not have a domain of all real numbers?

   A. $f(x) = x$
   B. $f(x) = x^3$
   C. $f(x) = \sqrt{x}$
   D. $f(x) = |x|$

8. Find $f(k - 1)$ when $f(x) = 4x^2 + 1$.

   A. $f(k - 1) = 4k^2$
   B. $f(k - 1) = 4k^2 - 8k + 5$
   C. $f(k - 1) = 4k^2 + 8k + 5$
   D. $f(k - 1) = 4k^2 - 3$

Part C: Short Answers - Application (10 marks)

9. Classify the following two relations as functions or not;
   Then, state their domain and range **in set notations**. (4 marks)

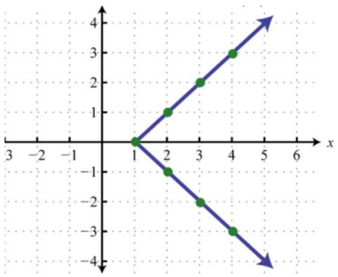
   1) {(-2, 3), (0, 5), (2, 6), (4, 8)}

   a. **Identify** this is a function or not, **explain** reasoning:

   b. Domain:

   c. Range:

   2)



   a. **Identify** this is a function or not, **explain** reasoning:

   b. Domain:

   c. Range:

Section II - Show Your Work

10. Evaluate the following radical or rational expressions. Remember to simplify your answers. (3 marks)

    1) $\sqrt{75x^2}$ = _____

    2) $3\sqrt{2}\,(6\sqrt{6} - \sqrt{10})$ = _____

    3) $\frac{5}{a} + \frac{3}{a-1}$ = _____ (for this questions, **please state restrictions**)

11. Given $f(x) = -3 - 5x$, **find its inverse** $f^{-1}(x)$ and **describe how their graphs are related**. (3 marks)

Part D: Short Answers - Thinking (5 marks)

12. Given the quadratic function $f(x) = 3x^2 - x - 3$,

    1) **Analyze** whether it has a minimum or maximum value. (1 mark)

    2) Based on the mathematic analysis, **find zeros** using **TWO** methods. (4 marks)

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

Part E: Short Answers - Communication (6 marks)

13. **Describe transformations** of the following functions compared their parent functions in the correct order; Then **state** their **domain and range** in the set notations:

    1) $g(x) = -3(x + 2)^2 + 6$

        a. Transformations:

        b. Domain:

        c. Range:

    2) $h(x) = \sqrt{-2(x - 1)} - 5$

        a. Transformations:

        b. Domain:

        c. Range: