

**Name:** \_\_\_\_\_

**UIN:** \_\_\_\_\_

T/TH class time:: \_\_\_\_\_

- You are expected to abide by the University's rules concerning Academic Honesty.
  - You may *not* use your books, notes, or any electronic device including calculators and cell phones.
  - Show ALL your work. Unsupported answers will not receive credit.
  - Always state a complete answer to the problem.

**Circle your instructor and TA:**

Cohen: McClellan Pant Chase White

Kashcheyeva: Jiang Alibek

Thulin: Sartipi Du

Lukina: Davies Li

Ross: Zielinski Ngom Meng

(20 pts) **1.** a. Sketch the graph  $f(x) = \sqrt{x}$ . Make sure to label two points on the graph.

b. Use transformations to sketch the graph  $g(x) = -\sqrt{x-3} + 4$ . Make sure to label two points on the graph.

c. Determine the domain and the range of the function  $g(x)$ .

Domain:

Range:

- (24 pts) 2. Consider the quadratic function  $p(x) = 2x^2 + x - 3$  and answer the following questions about  $p(x)$ .
- a. Determine the  $x$ - and  $y$ -intercepts of the graph of  $p(x)$ . Write your answer in point form.

- b. Find the vertex of  $p(x)$ , and determine whether this is a maximum, minimum, or neither for this function.

Vertex:

Circle: Minimum      Maximum      Neither

- c. Sketch a graph of  $p(x)$ , and label your intercepts and vertex.

- d. Determine the interval where  $p(x) \leq 0$ .

(16 pts) 3. Consider the function  $f(x) = 2x^3 - 5x^2 - x + 6$ .

a. List the potential rational zeros of  $f(x)$ .

b. Determine if  $x = -1$  is a zero of  $f(x)$ .

Yes      No

c. Factor  $f(x)$  into the product of linear terms.

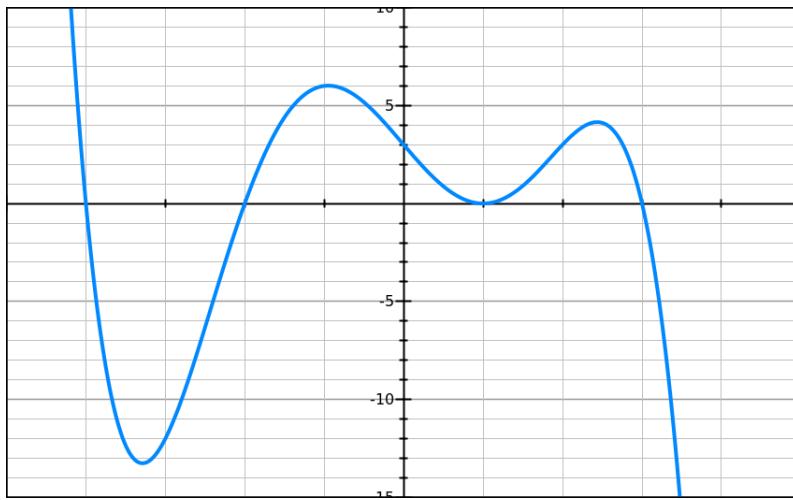
(15 pts) **4.** Find the vertical, horizontal, and oblique asymptotes, if any, for  $h(x) = \frac{x^3 + x^2 + 1}{x^2 - 1}$ .

Vertical:

Horizontal:

Oblique:

(15 pts) 5. Consider the following graph of a fifth degree polynomial, and answer the following questions.



- a. What are the  $x$ - and  $y$ -intercepts? Write your answer in point form.  
 $x$ -intercepts:

$y$ -intercepts:

- b. For each of the  $x$ -intercepts, state their likely multiplicity. Keep in mind this is a 5th degree polynomial.
- c. Construct the polynomial function that is graphed above. You may leave your answer in factored form. Please use your  $y$ -intercept to find the appropriate leading coefficient,  $a$ .