Name: _____ Precalculus 40

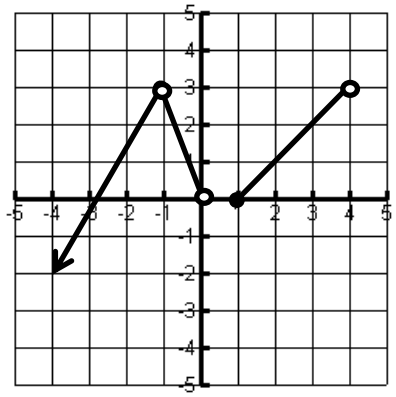
* Denotes Calculator Allowed Midterm Review

Chapter 1:

1. Solve the equations:
   a. $x^2 - 5x + 6 = 0$ b. $2x^2 - 3x - 9 = 0$

2. Determine the Domain and Range of the functions below:

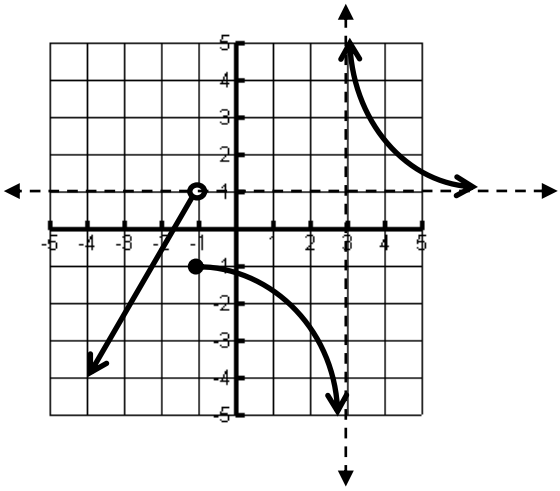
a.



Domain:

Range:

b.



Domain:

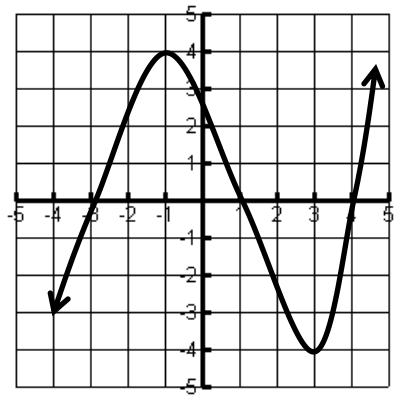
Range:

3. *Given the function, $f(x) = 3x^2 - 2x + 1, d$etermine the average rate of change over the interval [1, 8].

4. Rationalize the Complex Expression

   a. $\frac{2+i}{4-3i}$ b. $(3+2i)(5-3i)$

5. Approximate the following from the graph.
(The interval for both the x and y axis are by one)



a. Domain

b. Range

c. X-intercepts

d. Y-intercepts

e. Local maximum:

f. Local minimum:

g. Absolute Maximum:

h. Absolute Minimum:

i. Increasing:

j. Decreasing:

k. End behavior:

6. *The height of a flare can be modeled by the equation $h(t) = -16t^2 + 25t + 10$, where *h* is in feet and *t* is in seconds. What will be the maximum height of the flare?

7. Determine the inverse of the following functions. Determine their Domain.

a. $f(x) = 3x + 1$

b. $f(x) = \frac{2x+1}{x-1}$

8. Given the functions f and g determine each of the following:

a. $f(x) = 2x + 10$ $g(x) = x^2 + 9x + 20$

i. $(f + g)$ = Domain:

ii. $(f - g)$ = Domain:

iii. $(f \cdot g)$ = Domain:

iv. $\left(\frac{f}{g}\right)$ = Domain:

v. $[f \circ g](x)$

vi. $[g \circ f](x)$

vii. $[f \circ g](4)$

b. $f(x) = \frac{1}{x-1}$ $g(x) = \frac{x^2-1}{x}$

i. $(f + g)$ = Domain:

ii. $(f - g)$ = Domain:

iii. $(f \cdot g)$ = Domain:

iv. $\left(\frac{f}{g}\right)$ = Domain:

v. $[f \circ g](x)$

vi. $[g \circ f](x)$

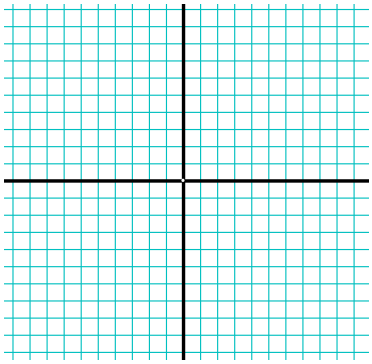
vii. $[f \circ g](1)$

9. Determine if the following functions are symmetric to the x-axis, y-axis, origin or none.

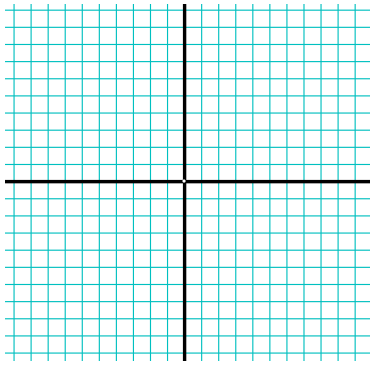
a. $f(x) = x^4 + 2x^2$ b. $f(x) = \frac{1}{3}x^5 - 3x^2$ c. $f(x) = -\frac{2}{x}$

10. Draw a graph that is

a. Odd.



b. Even



11. Given $f(x) = x^2 - 2x + 3 \text{ and } g(x) = x + 6$. Determine:

a. f(3)

b. $(f \circ g)(x)$

c. $(f \circ g)(-2)$

12. Verify by composition that f and g are inverses.

a. $f(x) = \sqrt{x-1} \quad g(x) = x^2 + 1$ b. $f(x) = 2x + 1 \quad g(x) = \frac{x-1}{2}$

Chapter 2:

13. Describe the end behavior of the following polynomial functions.
    a. $f(x) = -x^6 + 3x - 1$ b. $g(x) = 5x^7 + x^3 - x + 2$

14. Find all solutions of $x^3 - 3x - 2 = 0$

15. Determine the remainder when $5x^3 - 3x^2 + 2x - 1$ is dvided by x + 1.

16. Write a polynomial of 4^{th} degree given the roots 1, 3, and 4i.

17. *Use a graphing utility to approximate the solutions. Express the answer correct to two decimal places. $x^3 - 4x + 2 = 0$

18. Expand the binomials

a. $(2x - 1)^4$

b. $(x+2y)^3$

19. $\frac{4}{x-2} - \frac{2}{x} = \frac{14}{x^2-2x}$

20. Solve the inequality: $\frac{x^2-x-6}{x-1} \leq 0$

21. For each of the following:

i. Determine the domain of the function.

ii. Determine the x and y intercepts.

iii. Determine the vertical asymptote(s).

iv. State, if any, any horizontal or oblique asymptote(s).

a. $f(x) = \frac{4x}{x+1}$

b. $f(x) = \frac{x^2+5x+6}{x+3}$

22. Determine the equations of the asymptotes and/or holes for the following functions:

a. $f(x)=\dfrac{2x^3+7x^2-4}{x^2+2x-3}$

b. $g(x)=\dfrac{x+2}{x^2+2x-3}$

c. $k(x)=\dfrac{2x^2+5x-1}{5x^2}$

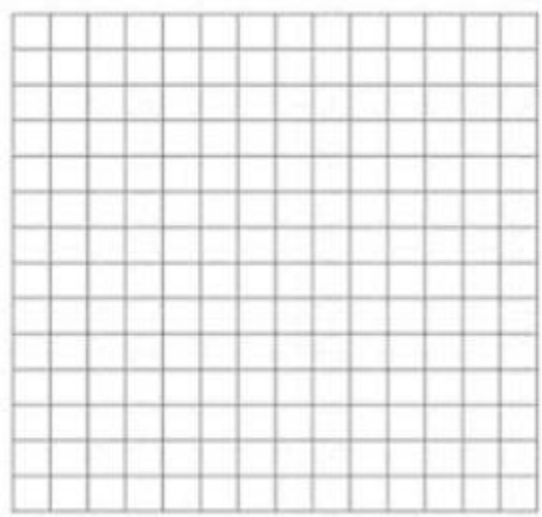
d. $h(x)=\dfrac{x^2+5x-6}{2x^2-5x+3}$

23.For the function $f(x) = -x^2(x+2)(x-3)^2$

a. Apply the leading term test to determine the end behavior.

b. Find the zeros and state the multiplicity of the zero.

c. Use the information from parts a and b to sketch a graph of the function.



Chapter 3:

24. Solve for x:

a. $3^{x^2-x}=9$

b. $\ln(3x-2)+\ln(x-1)=2\ln x$

c. $\log_{16}\sqrt[3]{128}=x$

d. $\log_3(2x+5)-\log_3 x=4$

25. Evaluate:

a. By hand: $\log_{16}\sqrt[3]{32}$

b. *Using Calculator: $\log_2 15$ (nearest hundredth)

26. Write as a single logarithm: $4\log_3 x-\frac{1}{3}\log_3 k+\frac{2}{5}\log_3 v-2\log_3 w$

27. Use the properties of logarithms to express as a sum/difference of logs:

$\log_k \frac{j^7\sqrt[3]{b^2}}{t^2}$

28. *What principal will yield an amount of $10,000 at 5.5% interest over 3 years compounded:

a. Monthly

b. Continuously

29. *Albert puts $200 into an account to use for school expenses. The account earns 12% interest, compound monthly. How much will be in the account after 5 years.

30. *Determine the amount Nicolette needs to deposit today to have $5000 for her wedding in 10 years if the account she is depositing in earns 2.5 % interest, compounded quarterly.

31. *Morgan has $450 to deposit into an account for a 5 year investment. Account A earns 6.5% interest compounded annually and account B earns 2.5% compounded continuously, which account should Brittany choose?

32. *How long will it take for Henry to triple his investment if the account he is using earns 2.8% compounded continuously?

33. *What rate will Henrietta need to invest her money in to double her investment in 5 years if the account is compounded continuously?