Math 1050 Section 3
Lynn Lindsay
Chapter 3 Exam Form A
DO NOT WRITE ON THIS EXAM!

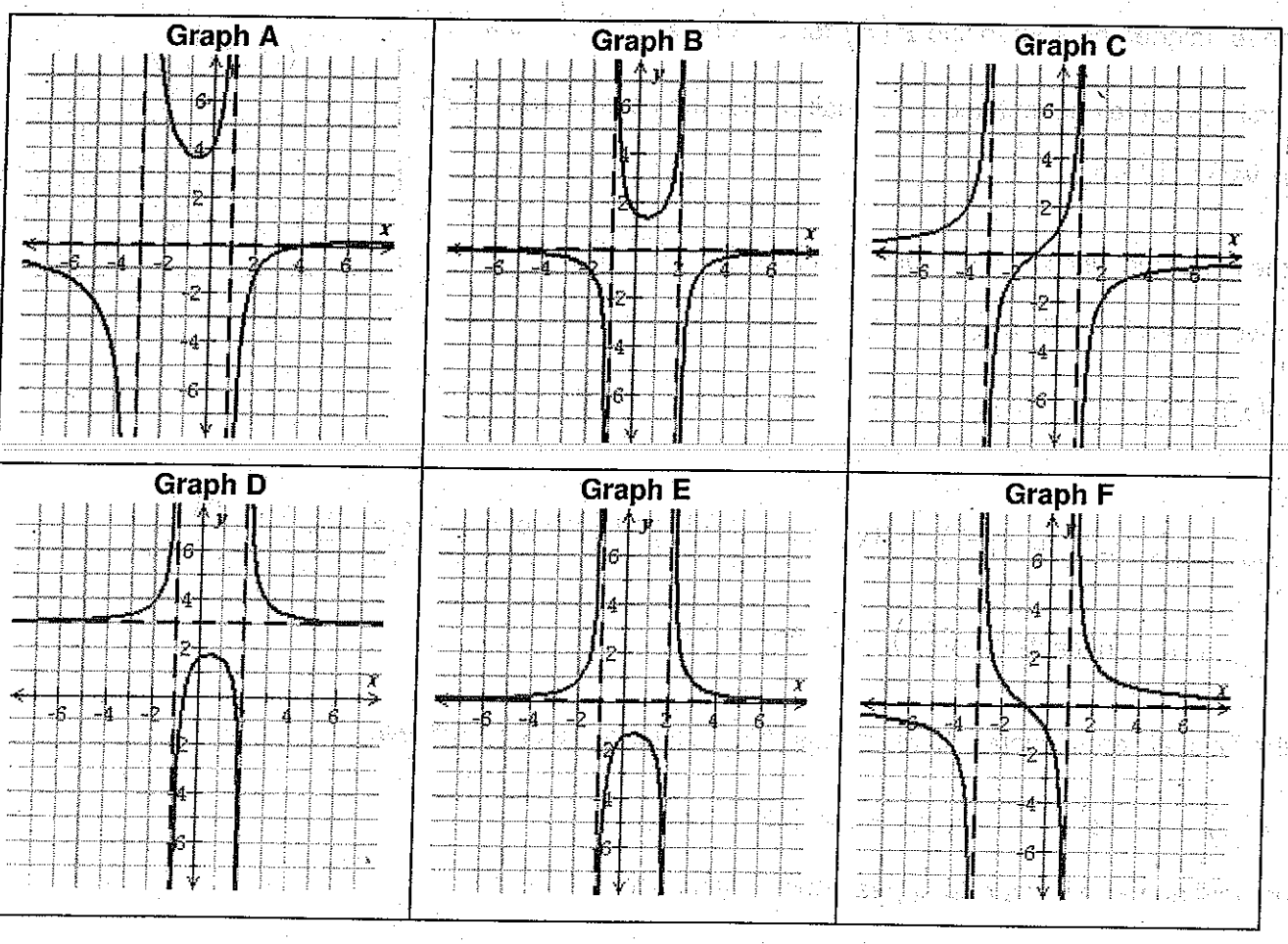
Directions: Put your name on each piece of scratch paper that you use. Turn in your scratch paper along with your answer sheet when you finish the exam. Do each problem in order on your scratch paper showing all the steps of your solution. Put your final answer neatly on the answer sheet. Remember to check your answers to insure a good score. Good luck, your preparation will pay off!

1. Consider the following rational functions.

$$g(x)=\frac{3x+3}{x^2+2x-3}$$

$$h(x)=\frac{3}{x^2-x-2}$$

Choose the graph of each function from the choices below.



2. Graph the rational function $h(x)=\dfrac{-2x^2+6x}{x^2-4x+3}$.

3. Graph all vertical and horizontal asymptotes of the function.

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

4. Graph the rational function $f(x)=\dfrac{-x^2-5x+1}{x+3}$.

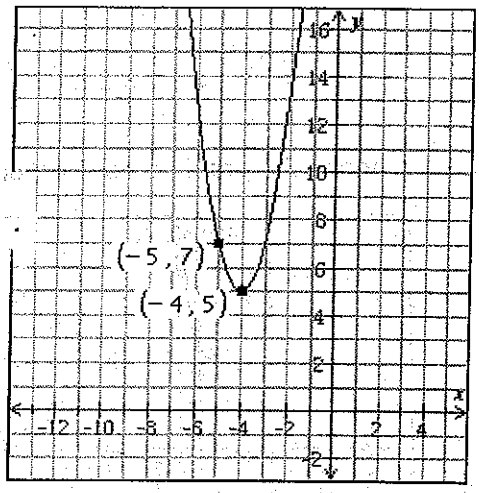
To graph the function, draw the asymptotes (if any) and plot at least two points on each piece of the graph.

5. Find a polynomial $f(x)$ of degree 4 that has the following zeros.

$-2\ ,\ 1\ ,\ -6\ ,\ 0$

Leave your answer in factored form.

6. Find the equation of the quadratic function f whose graph is shown



7. Use the remainder theorem to find $P(3)$ for $P(x)=x^4-2x^3-5x^2+7$.

Specifically, give the quotient and the remainder for the associated division and the value of $P(3)$.

8. Write the quadratic function in the form $f(x)=a(x-h)^2+k$.

Then, give the vertex of its graph.

$$f(x)=3x^2-18x+31$$

9. Divide.

$(3x^4-9x^3-4+11x^2)\div(3x^2-1)$ Write your answer in the form $Q(x)+\dfrac{R(x)}{3x^2-1}$,

where $Q(x)$ is the quotient and $R(x)$ is the remainder.

10. Use the rational zeros theorem to list all possible rational zeros of the following.

$$g(x)=-5x^4-x^3-3x^2-3x+3$$

Be sure that no value in your list appears more than once.

11. Find all real zeros of the function.

$$f(x)=2x(x-3)^2(x-4)^2$$

If there is more than one answer, separate them with commas.

12. Graph the solution to the following inequality on the number line.

$$x^2-6x<-8$$

13. Graph the rational function $f(x)=\dfrac{x-3}{-x-3}$.

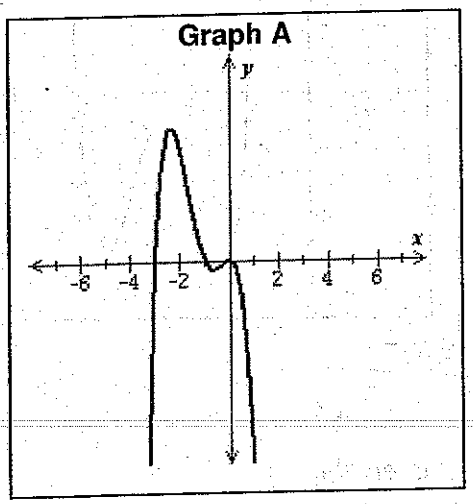
To graph the function, draw the horizontal and vertical asymptotes (if any) and plot at least two points on each piece of the graph.

14. Graph the rational function $g(x)=\dfrac{-3x-15}{x^2+7x+10}$.

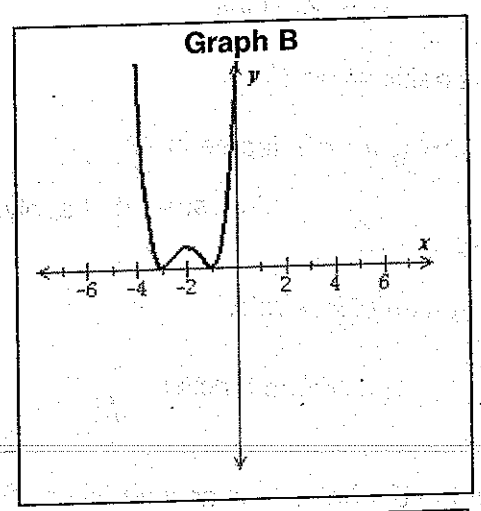
15. Consider the following polynomial functions. Choose the graph of each function from the choices below.

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

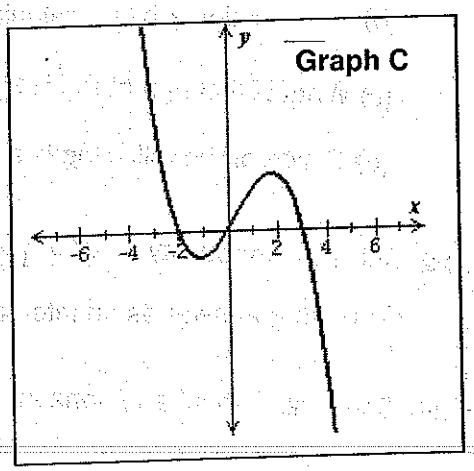
Graph A



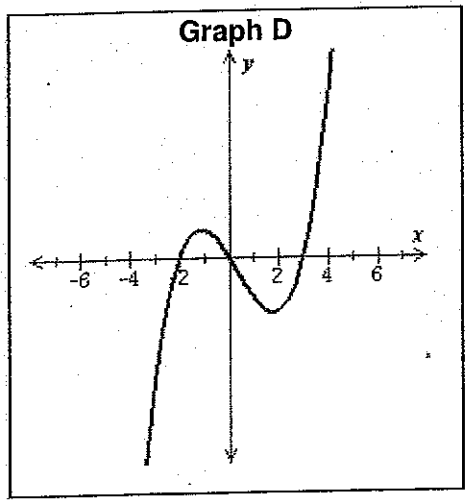
Graph B



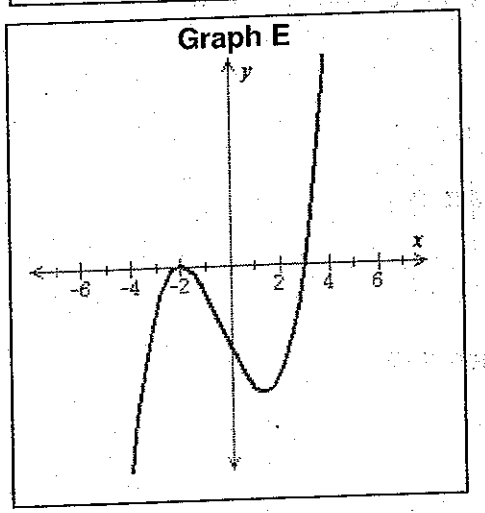
Graph C



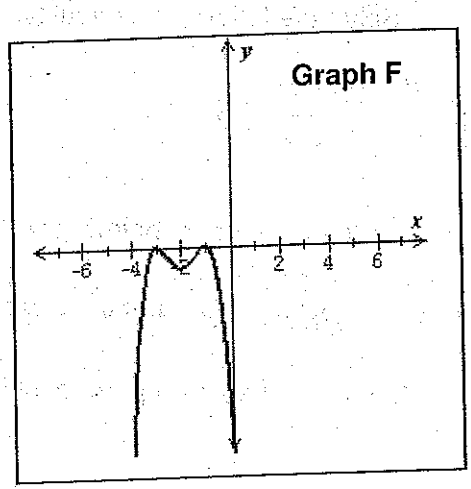
Graph D



Graph E



Graph F



16. Graph the rational function $f(x)=\dfrac{-x^2-5x-1}{x+1}$. To graph the function, draw the asymptotes (if any) and plot at least two points on each piece of the graph.

17. Solve the following inequality. Write your answer using interval notation.

$$\frac{x-1}{-x+6}>0$$

18. Find a polynomial $f(x)$ of degree 3 with real coefficients and the following zeros. $1,\ 1-i$

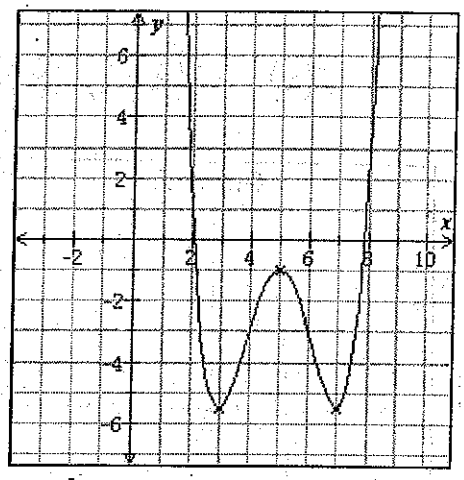
19. Use a graphing calculator to find the x-intercept(s) and vertex for the quadratic function. $f(x)=-4x^2-2x+3$

Round to the nearest hundredth if necessary. If there is more than one x-intercept, separate them with commas.

20. Use a graphing calculator to find all the zeros of the polynomial function. $f(x)=-x^3-2x^2+5x+4$

Round to the nearest hundredth. If there is more than one answer, separate them with commas.

21. Below is the graph of a polynomial function f with real coefficients. Use the graph to answer the following questions about f. All local extrema of f are shown in the graph.



(a) The function f is increasing over which intervals?

(b) The function f has local minima at which x-values?

(c) What is the sign of the leading coefficient of f?

(d) Which of the following is a possibility for the degree of f?

Choose all that apply.

22. Solve the inequality. $x^3+12x>-8x^2$

Write your answer as an interval or union of intervals.

23. Graph all vertical and horizontal asymptotes of the function. $f(x)=\dfrac{-9x-1}{2x^2-2x-12}$

24. Solve the following inequality. Write your answer as an interval or union of intervals.

$$\frac{x+7}{3-x}\geq 1$$

25. For the polynomial below, -2 is a zero.

$$h(x)=x^3+8x^2+30x+36$$

Express $h(x)$ as a product of linear factors.