Pre Calculus
Chapter 2A Review

Name: _____
Block: _____

No Calculator. Show all applicable work for full credit.

For questions 1-2, determine whether the function is a polynomial function or not. If so, state the degree and leading coefficient. If not, explain why not.(2-1)
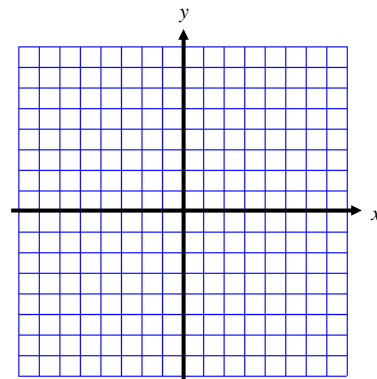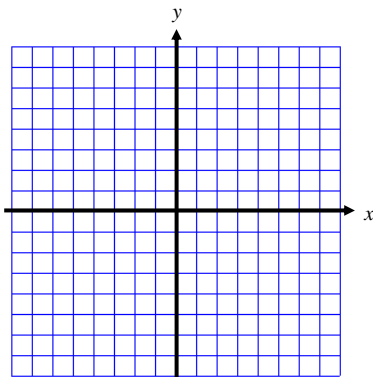
1. $f(x) = 12x^2 + x - 9$

2. $f(x) = 3x^{-1} + 1$

3. Find the equation of a line in general form where $f(-2) = 5$ and $f(1) = -7$. **(2-1)**

For questions 4-5, list the vertex, describe the transformation and draw a graph for each function. (2-1)

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

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

6. Write an equation for the quadratic function with vertex $(-3, 4)$ and containing the point $(-5, -8)$. Leave your answer in vertex form. **(2-1)**

*For questions 7-9, if the function is a power function list the constant of variation and the power. Then, **sketch** a graph for each function. If the function is not a power function, explain why not. (2-2)*

7. $f(x) = 4x^{1/3}$

8. $f(x) = -2x^5$

9. $f(x) = -4x^{-3}$

10. $f(x) = x^{1/4} + 2x$

*For questions 11-12, use limit notation to describe the end behavior of each polynomial. (**2-3**)*

11. $f(x) = -6x^5 + 3x^3 - 5x + 8$

12. $f(x) = -3x^4 + 6x^3 - 10$

*For each function in questions 13-14, list the degree, state each zero and its multiplicity, and then graph each polynomial. Note a scale on the x-axis. (**2-3**)*

13. $f(x) = -3x(x+4)^2(x+1)^3$

14. $f(x) = 3x^3 - 18x^2 + 27x$

15. Find all zeros for the function $f(x) = 4x^4 - 4x^3 - 11x^2 + 6x + 9$ given that -1 is a zero with multiplicity 2. (**2-3**)

16. Find the equation for a polynomial function with leading coefficient 2 and zeros $\frac{1}{3}, -1$ and 4. Express your answer in factored form and standard form. (**2-3**)
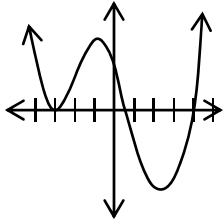
*Divide using long division. Write a summary statement in polynomial form. (**2-4**)*

17. $\dfrac{4x^3 - 8x^2 + 3x + 4}{2x+1}$

18. $(2x^3 - 5x + 9) \div (x+3)$

19. Use the remainder theorem to find the remainder when $f(x) = x^3 - 3x + 18$ is divided by $x + 3$. Is $x + 3$ a factor of $f(x)$? Explain. *(2-4)*

20. Use the graph below to help factor $f(x) = 2x^4 + 3x^3 - 32x^2 - 57x + 36$. The scale on the x-axis is 1 unit / tick. *(2-4)*

Calculator Allowed. Show all work for applicable credit.

21. Larry uses a slingshot to launch a rock straight up from a point 6 ft above level ground with an initial velocity of 170 ft/sec. Use the fact that $h(t) = -\frac{1}{2}gt^2 + v_0t + h_0$. *(2-1)*

    a. Find an equation that models the height of the rock t seconds after it is launched.

    b. What is the maximum height of the rock? When will it reach that height? Determine the answer algebraically and graphically.

    c. When will the rock hit the ground? Determine the answer algebraically and graphically.

Write the statement as a power function equation. Use k as the constant of variation. (2-2)

22. The area of an equilateral triangle varies directly as the square of the side s.

23. The height h of a cone with a fixed volume varies inversely as the square of its radius r.

For questions 24 and 25, write an equation and solve the problem. (2-2)

24. The period of vibration P for a pendulum varies directly as the square root of the length L. If the period of vibration is 3.5 sec when the length is 49 inches, find k, the constant of variation. Determine what the period is when $L = 5.0625$ inches.

25. The gravitational attraction A between two masses varies inversely as the square of the distance between them. The force of attraction is 2.25 lb when the masses are 4 ft apart. Find k, the constant of variation, and determine what the attraction is when the masses are 6 ft apart.

26. The table shows the number of employees of the Gizmo Company. *(2-4)*

Year	1972	1975	1978	1980	1983	1986
Num. of Employees	247	475	658	546	493	605

(a) Find a cubic regression equation, using $x =$ years after 1970. Round to the nearest thousandths for your equation.

(b) Use the original <u>regression</u> equation (NO ROUNDING) to predict the number of employees in 1990.

27. Use the Rational Zeros Theorem to list all the potential zeros of $f(x) = 6x^3 + x^2 - 10x + 3$. Then use synthetic division to find all zeros. *(2-4)*