Test Review
Chapter 4 with Spiral Ch. 2

ALL PROBLEMS MUST BE DONE ON SEPARATE PAPER OTHERWISE, THE REVIEW WILL NOT BE GRADED. SHOW ALL WORK FOR CREDIT. REVIEW IS DUE ON TEST DAY.

State whether the function is a polynomial function or not. If it is, give its degree. If it is not, tell why not.

1) $f(x) = 2x + 7x^3$ 2) $f(x) = \frac{2-x^2}{6}$

Use transformations of the graph of $y = x^4$ or $y = x^5$ to graph the function.

3) $f(x) = (x-5)^4$ 4) $f(x) = x^4 + 4$ 5) $f(x) = -\frac{1}{3}x^4$ 6) $f(x) = (x-4)^5 + 4$

Form a polynomial whose zeros and degree are given.

7) Zeros: -3, -2, 3; degree 3 8) Zeros: -4, -2, 2; degree 3

For the polynomial, list each real zero and its multiplicity. Determine whether the graph crosses or touches the x-axis at each x -intercept.

9) $f(x) = 3(x+1)(x+2)^3$ 10) $f(x) = 2(x^2+3)(x+1)^2$

Find the x- and y-intercepts of f.

11) $f(x) = (x+3)(x-2)(x+2)$ 12) $f(x) = -x^2(x+7)(x^2-1)$

Determine the maximum number of turning points of f.

13) $f(x) = -x^2(x+3)^3(x^2-1)$ 14) $f(x) = 6x - x^3$

Graph the following function. Include all intercepts and show end behavior, state the zeros and their multiplicities.

15) $f(x) = x^2(x+3)$ 16) $f(x) = -2(x-3)(x+2)^3$

Use the Remainder Theorem to find the remainder when f(x) is divided by x - c.

17) $f(x) = 5x^6 - 3x^3 + 8;\ x+1$

Use the Factor Theorem to determine whether x - c is a factor of f(x).

18) $f(x) = x^3 + 4x^2 - 10x + 12;\ x+6$ 19) $f(x) = x^4 + 7x^3 + 6x^2 + 34x - 56;\ x-7$

List the potential rational zeros of the polynomial function. Do not find the zeros.

20) $f(x) = -2x^3 + 2x^2 - 4x + 8$ 21) $f(x) = 11x^3 - x^2 + 5$

Use the Rational Zeros Theorem to find all the real zeros of the polynomial function. Use the zeros to factor f over the real numbers.

22) $f(x) = x^4 - 12x^2 - 64$ 23) $f(x) = 3x^3 - 2x^2 + 6x - 4$

Find the real solutions of the equation.

24) $2x^3 - x^2 - 20x + 10 = 0$ 25) $x^3 + 9x^2 + 26x + 24 = 0$

Information is given about a polynomial f(x) whose coefficients are real numbers. Find the remaining zeros of f.

26) $Degree\ 4;\ zeros:\ 5-5i,\ 2i$ 27) $Degree\ 3;\ zeros: 3,\ 4-i$

Form a polynomial f(x) with real coefficients having the given degree and zeros. *(4 pts)*

28) $Degree\ 3: zeros: 1+i\ and\ -6$

Find all zeros of the function and write the polynomial as a product of linear factors.

29) $f(x) = x^3 - x^2 + 25x - 25$

Find the domain of the rational function.

30) $g(x) = \frac{x+4}{x^2-1}$ 31) $h(x) = \frac{x+3}{x^2+1}$

Find the vertical asymptotes of the rational function.

32) $f(x) = \frac{x+7}{x^2-64}$ 33) $g(x) = \frac{x+5}{x^2+16}$

Give the equation of the horizontal asymptote, if any, of the function.

34) $h(x) = \frac{4x-4}{x-5}$ 35) $h(x) = \frac{x+6}{x^2-25}$ 36) $f(x) = \frac{-x^2}{x^2+5x+4}$

Give the equation of the oblique asymptote, if any, of the function.

37) $f(x) = \frac{x^2+3x-5}{x-7}$

Graph the function using transformations.

38) $f(x) = \frac{1}{x} - 3$ 39) $f(x) = \frac{3}{(6+x)^2}$

Graph the function.

40) $f(x) = \frac{3x}{(x-2)(x+3)}$

Solve the problem.

41) The concentration of a drug in the bloodstream, measured in milligrams per liter, can be modeled by the function, $C(t) = \frac{12t+4}{3t^2+2}$, where t is the number of minutes after injection of the drug. When will the drug be at its highest concentration? Approximate your answer rounded to two decimal places.

Solve the inequality algebraically. Express the solution in interval notation.

42) $(x+6)(x+3)(x+1) < 0$ 43) $x^3 - 6x^2 > 0$ 44) $\frac{x-2}{x+3} > 0$ 45) $\frac{x-1}{x+2} < 0$

Determine algebraically whether the function is even, odd, or neither.

46) $f(x) = -4x^2 + 3$ 47) $f(x) = 3x^3 + 9$ 48) $f(x) = \sqrt[3]{x}$

Graph the function.

49) $f(x) = \begin{cases} -x+3 & if \ x < 2 \\ 2x-3 & if \ x \geq 2 \end{cases}$

50) $f(x) = \begin{cases} x+4 & if \ -7 \leq x < 3 \\ -4 & if \ x = 3 \\ -x+5 & if \ x > 3 \end{cases}$

Find the value for the function.

51) Find $f(x-1)$ when $f(x) = 5x^2 + 2x + 6$.

For the given functions f and g, find the requested function and state its domain.

52) $f(x) = 6x - 2$; $g(x) = 4x - 6$ **Find** $f - g$.

Find and simplify the difference quotient of f, $\frac{f(x+h)-f(x)}{h}$ $h \neq 0$ **, for the function.**

53) $f(x) = 3x + 7$

Use a graphing utility to graph the function over the indicated interval and approximate any local maxima and local minima. Determine where the function is increasing and where it is decreasing. If necessary, round answers to two decimal places.

54) $f(x) = x^3 - 4x^2 + 6; \quad (-1, 4)$