Practice Test 3

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

1) $f(x) = 14x^5 + 4x^4 + 6$

2) $f(x) = \frac{8 - x^5}{5}$

3) $f(x) = 1 + \frac{9}{x}$

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

4) $f(x) = (x + 5)^5$

Form a polynomial whose zeros and degree are given.

5) Zeros: 3, multiplicity 2; –3, multiplicity 2; degree 4

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

6) $f(x) = 3(x - 7)(x - 1)^3$

7) $f(x) = 3(x^2 + 4)(x^2 + 1)^2$

Find the x– and y–intercepts of f.

8) $f(x) = (x + 11)^2$

Find the power function that the graph of f resembles for large values of $|x|$.

9) $f(x) = (x - 1)^6(x + 12)^2$

Use the x–intercepts to find the intervals on which the graph of f is above and below the x–axis.

10) $f(x) = (x - 2)^2(x + 3)^2$

Graph the function using transformations.

13) $f(x) = \dfrac{3}{(6 + x)^2}$

Practice Test 3

Analyze the graph of the given function f as follows:

(a) Determine the end behavior: find the power function that the graph of f resembles for large values of $|x|$.

(b) Find the x– and y–intercepts of the graph.

(c) Determine whether the graph crosses or touches the x–axis at each x–intercept.

(d) Graph f using a graphing utility.

(e) Use the graph to determine the local maxima and local minima, if any exist. Round turning points to two decimal places.

(f) Use the information obtained in (a) – (e) to draw a complete graph of f by hand. Label all intercepts and turning points.

(g) Find the domain of f. Use the graph to find the range of f.

(h) Use the graph to determine where f is increasing and where f is decreasing.

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

12) For the polynomial function $f(x) = 2x^4 - 7x^3 + 11x - 4$

a) Find the x– and y–intercepts of the graph of f. Round to two decimal places, if necessary.

b) Determine whether the graph crosses or touches the x–axis at each x–intercept.

c) End behavior: find the power function that the graph of f resembles for large values of $|x|$.

d) Use a graphing utility to graph the function.Approximate the local maxima rounded to two decimal places, if necessary. Approximate the local minima rounded to two decimal places, if necessary.

e) Determine the number of turning points on the graph.

f) Put all the information together, and connect the points with a smooth, continuous curve to obtain the graph of f.

Graph the function.

14) $f(x) = \dfrac{2x}{(x-3)(x-1)}$

15) $f(x) = \dfrac{x^2 - 7x + 10}{(x-4)^2}$

Solve the inequality.

16) $x^3 - 3x^2 - 40x > 0$

17) $\frac{(x + 10)(x - 5)}{x - 1} \geq 0$

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

21) Degree: 3; zeros: -2 and $3 + i$.

Practice Test 3

Use Descartes' Rule of Signs and the Rational Zeros Theorem to find all the real zeros of the polynomial function. Use the zeros to factor f over the real numbers.

18) $f(x) = 4x^4 - 7x^3 + 11x^2 - 14x + 6$ This one is REALLY hard if you can't factor by grouping!

19) $f(x) = x^4 - 4x^3 - x^2 + 10x + 6$ I cooked this one up fairly carefully to come out "nice."

Solve the equation in the real number system.

20) $3x^3 - x^2 - 15x + 5 = 0$

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

22) $f(x) = x^3 + 5x^2 + 11x + 7$