Advanced Algebra　　　　　　　　　　　　　Name _____
Homework 5.1
Polynomial Functions　　　　　　　　　　 Period _____

SHOW ALL WORK.

Complete Parts A & B OR Parts B & C

PART A:

Decide whether the function is a polynomial function. If so, write it in standard form and state its degree, type, and leading coefficient.

1. $f(x)=8-x^2$　　　　　　　　**2.** $f(x)=6x+8x^4-3$　　　　　　　**3.** $g(x)=\pi x^4+\sqrt{6}$

Describe the end behavior of the graph of the polynomial function by completing these statements:

$f(x)\to\ \underline{?}\ $ as $x\to-\infty$ and $f(x)\to\ \underline{?}\ $ as $x\to\infty$.

4. $f(x)=10x^4$　　　　　　　**5.** $f(x)=-x^6+4x^3-3x$　　　　　　**6.** $f(x)=-2x^3+7x-4$
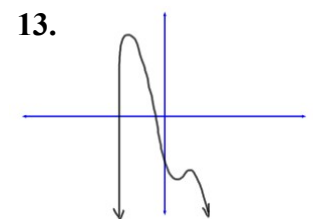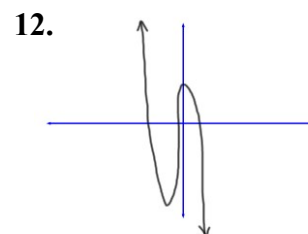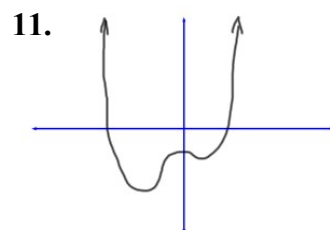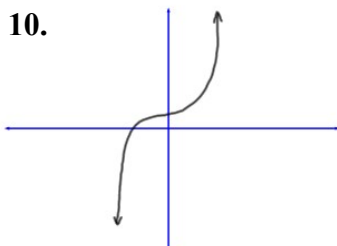
PART B:

Decide whether the function is a polynomial function. If so, write it in standard form and state its degree, type, and leading coefficient.

7. $h(x)=x^3\sqrt{10}+5x^{-2}+1$　　　　**8.** $h(x)=-\dfrac{5}{2}x^3+3x-10$　　　　**9.** $g(x)=8x^3-4x^2+\dfrac{2}{x}$

Describe the degree and the leading coefficient of the polynomial function whose graph is shown below.

10.　　　　　　　　　　**11.**　　　　　　　　　　**12.**　　　　　　　　　　**13.**

Describe the end behavior of the graph of the polynomial function by completing these statements:

$f(x) \to$ _?_ as $x \to -\infty$ and $f(x) \to$ _?_ as $x \to \infty$.

14. $f(x) = x^7 + 3x^4 - x^2$

15. $f(x) = 3x^{10} - 16x$

16. $f(x) = -6x^5 + 14x^2 + 20$

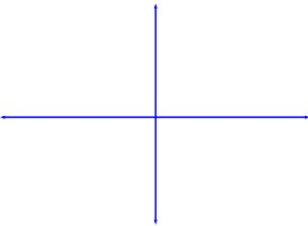**17.** $f(x) = 0.2x^3 - x + 45$

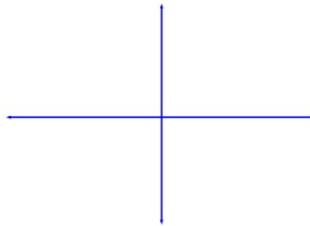**18.** $f(x) = 5x^8 + 8x^7$

19. $f(x) = -x^{273} + 500x^{271}$

20. Write a polynomial function f of degree 5 such that the end behavior of the graph of f is given by $f(x) \to +\infty$ as $x \to -\infty$ and $f(x) \to -\infty$ as $x \to \infty$.

Find the y-intercept, degree, and leading coefficient, then sketch a graph of the polynomial function based on its end-behavior.
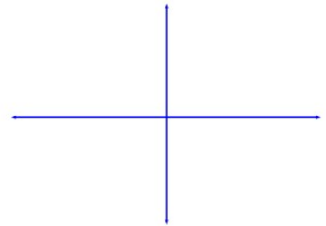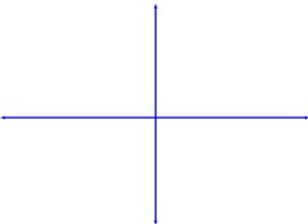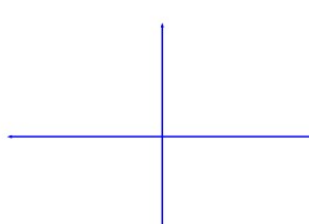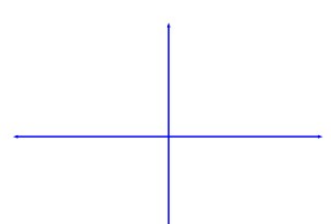
21. $f(x) = x^3$

22. $f(x) = -x^4$

23. $f(x) = x^5 + 3$

24. $x^4 - 2$

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

26. $f(x) = x^3 - 5x$

27. Suppose $f(x) \to +\infty$ as $x \to -\infty$ and $f(x) \to -\infty$ as $x \to \infty$.

Describe the end-behavior of $g(x) = -f(x)$.

28. Let $f(x) = x^3$ and $g(x) = x^3 - 2x^2 + 4x$.

x	$f(x)$	$g(x)$	$\dfrac{f(x)}{g(x)}$
10			
20			
50			
100			
200			

a. Complete the table

b. Use the numbers in the table to complete this statement:

As $x \to +\infty, \dfrac{f(x)}{g(x)} \to ?$.

c. Explain how the result from part b shows that the functions f and g have the same end behavior as $x \to +\infty$.

29. The weight y (in pounds) of a rainbow trout can be modeled by $y = 0.000304x^3$ where x is the length of the trout (in inches).

a. Write a function that relates the weight y and the length x of a rainbow trout if y is measured in kilograms and x is measured in centimeters. Use the fact that 1 kilogram $\approx$ 2.20 pounds and 1 centimeter $\approx$ 0.394 inch.

b. Graph the original function and the function from part **a** in the same coordinate plane. What type of transformation can you apply to the graph of $y = 0.000304x^3$ to produce the graph from part **a**?