State the Degree, Leading Coefficient, and End Behavior of each function.

1. $h(x) = 4x^3 - 6x + 1$

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

3. $m(x) = -\frac{1}{4}x^5 + 7$

Factor each sum and difference of cubes.

4. $3x^3 - 81$

5. $2x^6 + 54$

6. $8x^3 - 125$

List the possible rational roots (p/q's) and then find all the real roots of each polynomial equation.

7. $x^3 - 2x^2 - 19x + 20 = 0$

8. $x^3 - 6x^2 + 11x - 6 = 0$

9. $10x^4 - 13x^3 - 21x^2 + 10x + 8 = 0$

Write a polynomial equation in standard form given the zeros.
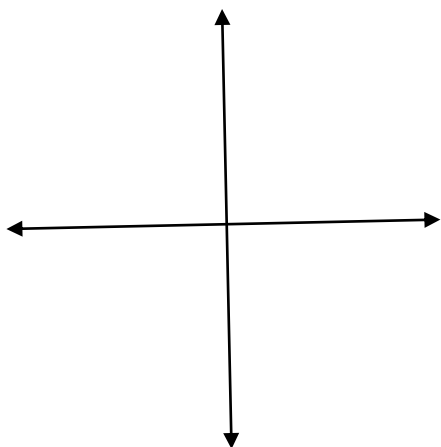
10. $2, -1, \frac{1}{3}$

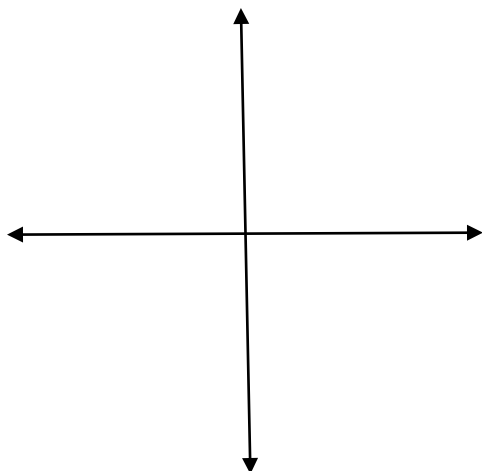11. $-2i, 2i, 0, -4$

12. $2 + i, 2 - i, 5$

Graph each polynomial function showing zeros, y-intercept, and end behavior. Identify the characteristics of each function.
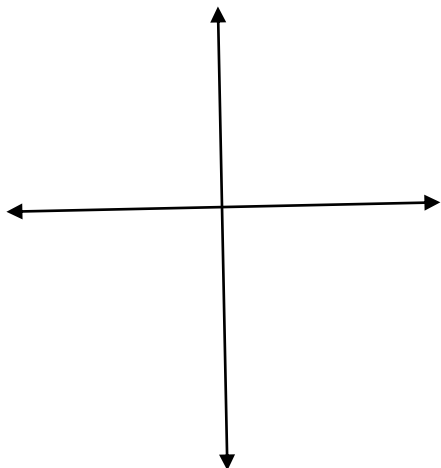
13. $f(x) = (x - 3)(x + 2)^2$

Zeros	Multiplicity	Cross/Bounce?
_____	_____	_____
_____	_____	_____

Y-intercept: _____

Degree of the polynomial: _____

Pos./Neg. Leading Coefficient? _____

End Behavior: x ➝ ∞ , f(x) ➝ _____

x ➝ - ∞ , f(x) ➝ _____

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

Zeros	Multiplicity	Cross/Bounce?
_____	_____	_____
_____	_____	_____
_____	_____	_____

Y-intercept: _____

Degree of the polynomial: _____

Pos./Neg. Leading Coefficient? _____

End Behavior: x ➝ \ ∞ , f(x) ➝ _____

x ➝ - ∞ , f(x) ➝ _____

15. $f(x) = x^3 - 2x^2 - 9x + 18$

Zeros	Multiplicity	Cross/Bounce?
_____	_____	_____
_____	_____	_____
_____	_____	_____

Y-intercept: _____

Degree of the polynomial: _____

Pos./Neg. Leading Coefficient? _____

End Behavior: x ➝ ∞ , f(x) ➝ _____

x ➝ - ∞ , f(x) ➝ _____

16. $f(x) = -x^4 + 26x^2 - 25$

Zeros	Multiplicity	Cross/Bounce?
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Y-intercept: _____

Degree of the polynomial: _____

Pos./Neg. Leading Coefficient? _____

End Behavior: $x \rightarrow \infty$, $f(x) \rightarrow$ _____
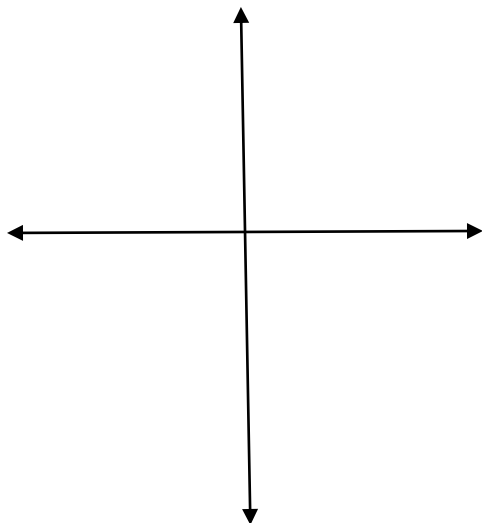
$x \rightarrow -\infty$, $f(x) \rightarrow$ _____

Use the graph at the right to answer questions 17 – 23.

17. In the table below, state the zeros and what their **LEAST** multiplicity could be.

Zeros		
Multiplicity		

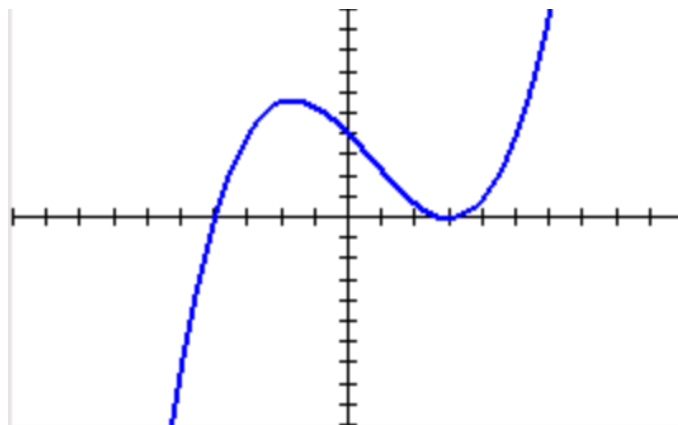18. Is the leading coefficient of the function positive or negative?

19. Is the degree of the function even or odd?

20. How many turning points does the function have?

21. What is the **LEAST** degree this polynomial could be?

22. Is the graph increasing or decreasing at the interval (3, ∞)?

23. How many **absolute max/min** points does this graph have?

Use the graph at the right to answer questions 24 – 29.

24. In the table below, state the zeros and what their **LEAST** multiplicity could be.

Zeros			
Multiplicity			

25. Is the leading coefficient of the function positive or negative?

26. Is the degree of the function even or odd?

27. How many turning points does the function have?

28. What is the **LEAST** degree this polynomial could be?

29. How many **relative max/min points** does this graph have?