A2: Analyzing Polynomial Functions Worksheet

I. Describe the end behavior of each function.

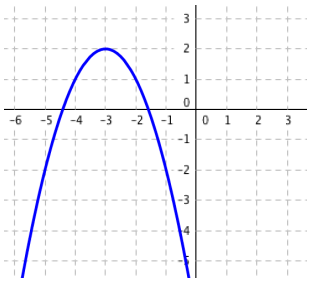
1. $f(x) = x^3 - 4x^2 + 7$
2. $f(x) = -x^2 + 4x$
3. $f(x) = -6x^5 - 4x^3 + 5x + 2$
4. $f(x) = 3x^2 - 6x + 11$

II. State the maximum number of turns the graph of each function could have.

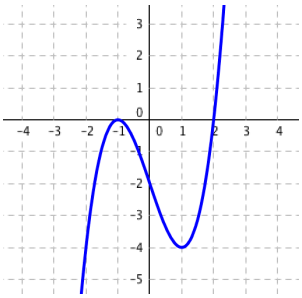
5. $f(x) = x^5 - 4x^3 + 5x + 1$
6. $f(x) = -x^2 - 1$

III. Using the graph of $f(x)$ Determine if the zeros of each function have an even or odd multiplicity. Explain.

7. $f(x) = -x^2 - 6x - 7$



8. $f(x) = x^3 - 3x - 2$



Factor completely.

9. $x^3 + 8$
10. $25x^2 + 10x + 1$
11. $18x^3 - 3x^2 + 42x - 7$
12. $x^2 + 2x - 8$
13. $2b^3 - 54$
14. $16n^3 - 48n^2 + 6n - 18$
15. $x^4 + 7x^2 - 8$
16. $6x^3 + 15x^2 - 9x$
17. $8x^3 + 12x^2$
18. $48a^2 - 27$

ANSWERS

1.

$$x \to -\infty,\ f(x) \to -\infty$$
$$x \to \infty,\ f(x) \to \infty$$

2.

$$x \to -\infty,\ f(x) \to -\infty$$
$$x \to \infty,\ f(x) \to -\infty$$

3.

$$x \to -\infty,\ f(x) \to \infty$$
$$x \to \infty,\ f(x) \to -\infty$$

4.

$$x \to -\infty,\ f(x) \to \infty$$
$$x \to \infty,\ f(x) \to \infty$$

5. 4
6. 1

7. The graph has a cross at both zeros therefore both zeros have an *odd* multiplicity.

8. The graph has a bounce at x=-1, therefore this zero has an *even* multiplicity. The graph has a cross at x=2, therefore this zero has an *odd* multiplicity.

9. $(x + 2)(x^2 - 2x + 4)$

10. $(5x + 1)^2$

11. $(3x^2 + 7)(6x - 1)$

12. $(x + 4)(x - 2)$

13. $2(b - 3)(b^2 + 3b + 9)$

14. $2(8n^2 + 3)(n - 3)$

15. $(x - 1)(x + 1)(x^2 + 8)$

16. $3x(2x - 1)(x + 3)$

17. $4x^2(2x + 3)$

18. $3(4x + 3)(4n - 3)$