Handout – Left/Right Behaviors of Polynomial Functions and Multiplicity

Use this symbolic statement to describe the end behaviors of the following functions.

$$\text{As } x \to -\infty, f(x) \to \underline{\qquad}$$
$$\text{As } x \to \infty, f(x) \to \underline{\qquad}$$

1) $f_{(x)} = 3x^3 + 6x^2 - 5$

2) $f_{(x)} = x^6 + 5x^3 + 7x^2 - x - 2$

3) $f_{(x)} = x(x+2)^3(x-3)(x+1)$

4) $f_{(x)} = -x^4 + 5x - 6$

5) $f_{(x)} = -\frac{1}{2}x^3 + 2x^2 - 3x + 5$

6) $f_{(x)} = 7x^8 - 6x^6 + 2x^4 - 8$

7) $f_{(x)} = 2x^5 + 3x^2 - x + 5$

8) $f_{(x)} = -x^3 + 3x^2 + 12x^6 - 8$

9) $f_{(x)} = 14x^2 + 7x^3$

10) $f_{(x)} = -0.2x^5 + 6x^3 - x^2$

Find the roots of the polynomial functions below and identify the multiplicity of each.

11) $f_{(x)} = -(x+3)^3(x-4)$

12) $f_{(x)} = (x+2)^2(x-5)^5$

13) $f(x) = x(x-2)^2(x+4)$

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

15) $f(x) = x^2(x+5)^2(x-5)^2$