End Behaviors of Polynomial Functions

How do you determine the degree of a polynomial:

in General Form ($ax^n + bx^{n-1} + cx^{n-2}...+k$ **)**

in Factored Form:

Give 4 examples of an even degree polynomial and 4 examples of an odd degree polynomial.

   Even Degree   **Odd Degree**

What is the difference with respect to end behaviors of a polynomial function of even degree vs. odd degree?

   Even Degree   **Odd Degree**

Determine the end behaviors of each of the following polynomial functions.

1. $f(x) = 3x^5 + 12x^4 + 6x - 8$

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

As $x \to \infty, f(x) \to$ _____

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

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

As $x \to \infty, f(x) \to$ _____

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

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

As $x \to \infty, f(x) \to$ _____

4. $f(x) = -2x^5 - 8x^2 + 36x$

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

As $x \to \infty, f(x) \to$ _____

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

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

As $x \to \infty, f(x) \to$ _____

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

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

As $x \to \infty, f(x) \to$ _____

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

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

As $x \to \infty, f(x) \to$ _____

8. $f(x) = -3(x-1)(x-6)^2$

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

As $x \to \infty, f(x) \to$ _____

9. $f(x) = 5x^5 - 12x^4 + 6x^2 - 2x + 1$

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

As $x \to \infty, f(x) \to$ _____

10. $f(x) = -2x^4 + 7x^3 - 2x^2 + 36x - 18$

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

As $x \to \infty, f(x) \to$ _____

11. $f(x) = x^4 - 3x^2 + 8x^5 - 21$

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

As $x \to \infty, f(x) \to$ _____

12. $f(x) = -12x^2 - 7x^3 + 3x - 2$

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

As $x \to \infty, f(x) \to$ _____