Name _____   Date _____
Mr. Schlansky   Algebra II

End Behavior and Shape of Polynomial Graphs

Sketch the shape and fill in the end behavior for each of the following polynomial equations

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

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

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

2. $f(x) = x^4 - 10x^2 + 9$

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

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

3. $p(x) = -x^3 - 3x^2 + 4x + 12$

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

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

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

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

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

5. $p(x) = x^3 - 3x^2 - 9x + 27$

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

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

6. $h(x) = x^6 - 5x^4 + 4x^2$

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

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

7. $g(x) = -\dfrac{1}{2}x^5 - 4x^2 + 3x^2 - 7$

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

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

8. $f(x) = x^4 + 11x^3 + 15x^2 - 25x$

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

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

9. $g(x) = -x^6 + 2x^3 + 4x^2 - 8x$

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

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

10. $m(x) = 2x^3 + 4x^2 - 8x$

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

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

11. $f(x) = -2x^4 - 2x^3 + 34x^2 + 42x - 72$

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

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

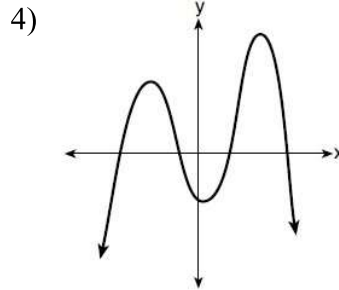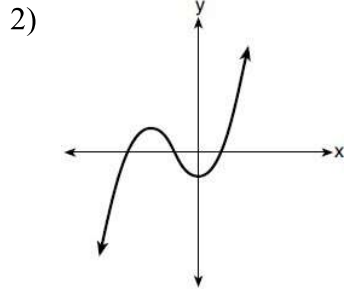12. $g(x) = -x^5 + 5x^4 + 8x^3 - 44x^2 - 32x + 64$

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

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

13. Consider the end behavior description below.

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

Which function satisfies the given conditions?

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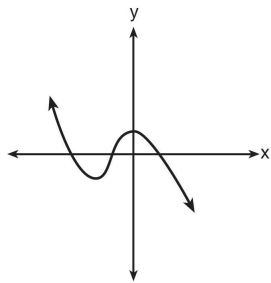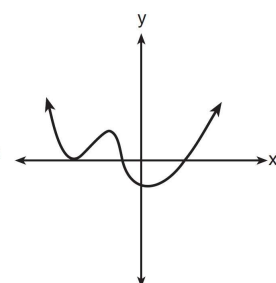
3) $f(x) = -x^3 + 2x - 6$

2)

4)

14. Which graph has the following characteristics?
- three real zeros
- as $x \to -\infty, \ f(x) \to -\infty$
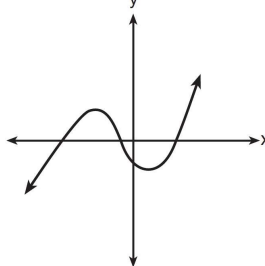- as $x \to \infty, \ f(x) \to \infty$

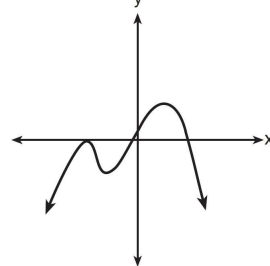1)   2)   3)   4)

15. Which description could represent the graph of $f(x) = 4x^2(x+a) - x - a$, if a is an integer?

1) As $x \to -\infty, f(x) \to \infty$, as $x \to \infty, f(x) \to \infty$, and the graph has 3 x-intercepts.

3) As $x \to -\infty, f(x) \to \infty$, as $x \to \infty, f(x) \to -\infty$, and the graph has 4 x-intercepts.

2) As $x \to -\infty, f(x) \to -\infty$, as $x \to \infty, f(x) \to \infty$, and the graph has 3 x-intercepts.

4) As $x \to -\infty, f(x) \to -\infty$, as $x \to \infty, f(x) \to \infty$, and the graph has 4 x-intercepts.