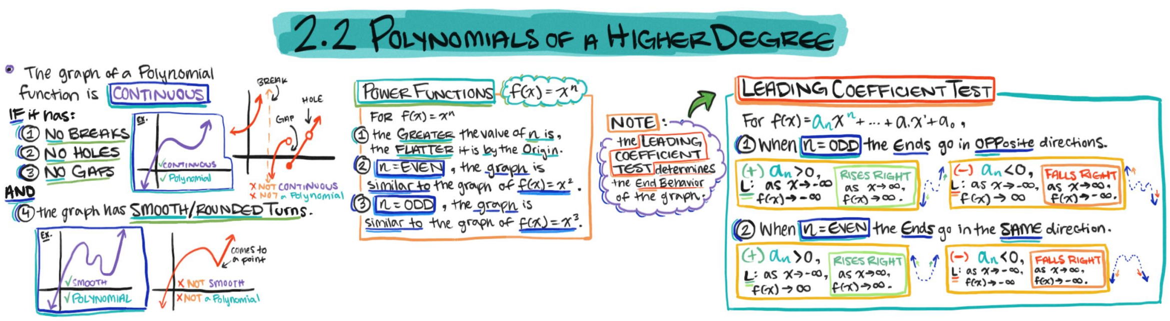
2.2 Polynomials of a Higher Degree

Objective: Today we will compare polynomial functions and use the Leading Coefficient Test to determine a functions end behavior.

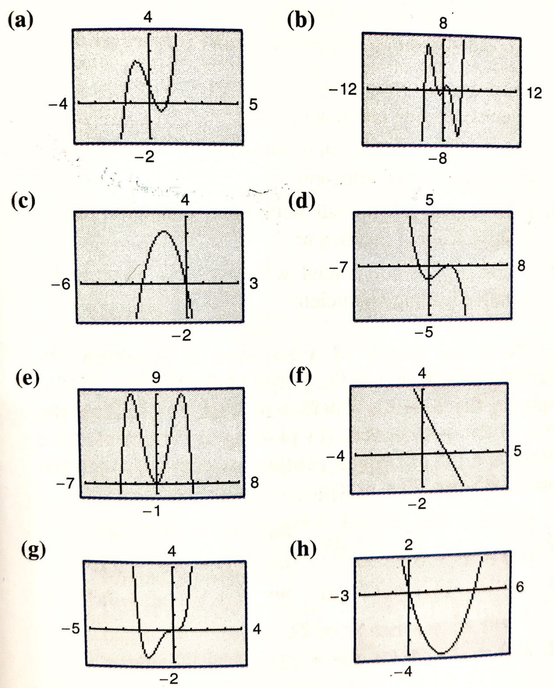
Warm-up: Write the equation of the parabola whose vertex is given and goes through the given point.

Vertex: (–3, 5) **Point: (5, 17)**



Math Analysis

Identifying Graphs of Polynomial Functions In Exercises 9–16, match the polynomial function with its graph. [The graphs are labeled (a) through (h).]



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

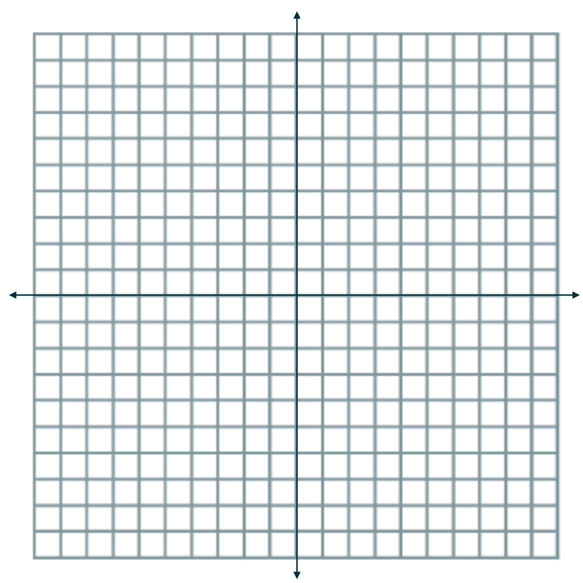
12. $f(x) = 2x^3 - 3x + 1$

14. $f(x) = -\frac{1}{3}x^3 + x^2 - \frac{4}{3}$

16. $f(x) = \frac{1}{5}x^5 - 2x^3 + \frac{9}{5}x$

Library of Parent Functions In Exercises 17–22, sketch the graph of $y = x^3$ and the graph of the function f. Describe the transformation from y to f.

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



Math Analysis

Comparing End Behavior In Exercises 23–28, use a graphing utility to graph the functions f and g in the same viewing window. Zoom out far enough to see the right-hand and left-hand behavior of each graph. Do the graphs of f and g have the same right-hand and left-hand behavior? Explain why or why not.

24. $f(x) = -\frac{1}{3}(x^3 - 3x + 2), \quad g(x) = -\frac{1}{3}x^3$

28. $f(x) = -(x^4 - 6x^2 - x + 10), \quad g(x) = x^4$

Applying the Leading Coefficient Test In Exercises 29–36, use the Leading Coefficient Test to describe the right-hand and left-hand behavior of the graph of the polynomial function. Use a graphing utility to verify your result.

30. $h(x) = 1 - x^6$

34. $f(x) = \dfrac{3x^7 - 2x^5 + 5x^3 + 6x^2}{4}$

32. $f(x) = \frac{1}{3}x^3 + 5x$