

1. State the Intermediate Value Theorem

Suppose that f is a polynomial function and $[a, b]$ is an interval for which $f(a) \neq f(b)$. If k is a number between $f(a)$ and $f(b)$, then there is a number c in the interval (a, b) such that $f(c) = k$.

2. Describe the 3 types of symmetry discussed in Section 3.5.

1. The graph of a function $f(x)$ is *symmetric about the y-axis* and f is an even function if $f(-x) = f(x)$ for any value of x in the domain of the function. (Section 2.3)
2. The graph of a function $f(x)$ is *symmetric about the origin* and f is an odd function if $f(-x) = -f(x)$ for any value of x in the domain of the function. (Section 2.3)
3. The graph of a quadratic function $f(x) = ax^2 + bx + c$ is *symmetric about its axis of symmetry, $x = -b/(2a)$* . (Section 3.1)

3. State the Theorem describing behavior at the x -intercepts.

Let a be a root with multiplicity k for a polynomial function.
 If k is odd, then the graph crosses the x -axis at $(a, 0)$.
 If k is even, then the graph touches but does not cross the x -axis at $(a, 0)$.

4. State the Leading Coefficient Test.

If $f(x) = a_n x^n + a_{n-1} x^{n-1} + \cdots + a_1 x + a_0$, the behavior of the graph of f to the left and right is determined as follows:

For n odd and $a_n > 0$,	$\lim_{x \rightarrow \infty} f(x) = \infty$	and	$\lim_{x \rightarrow -\infty} f(x) = -\infty$.
For n odd and $a_n < 0$,	$\lim_{x \rightarrow \infty} f(x) = -\infty$	and	$\lim_{x \rightarrow -\infty} f(x) = \infty$.
For n even and $a_n > 0$,	$\lim_{x \rightarrow \infty} f(x) = \infty$	and	$\lim_{x \rightarrow -\infty} f(x) = \infty$.
For n even and $a_n < 0$,	$\lim_{x \rightarrow \infty} f(x) = -\infty$	and	$\lim_{x \rightarrow -\infty} f(x) = -\infty$.

5. Give the 6-step strategy for graphing a polynomial.

1. Check for symmetry.
2. Find all real zeros of the polynomial function.
3. Determine the behavior at the corresponding x -intercepts.
4. Determine the behavior as $x \rightarrow \infty$ and as $x \rightarrow -\infty$.
5. Calculate several ordered pairs including the y -intercept to verify your suspicions about the shape of the graph.
6. Draw a smooth curve through the points to make the graph.