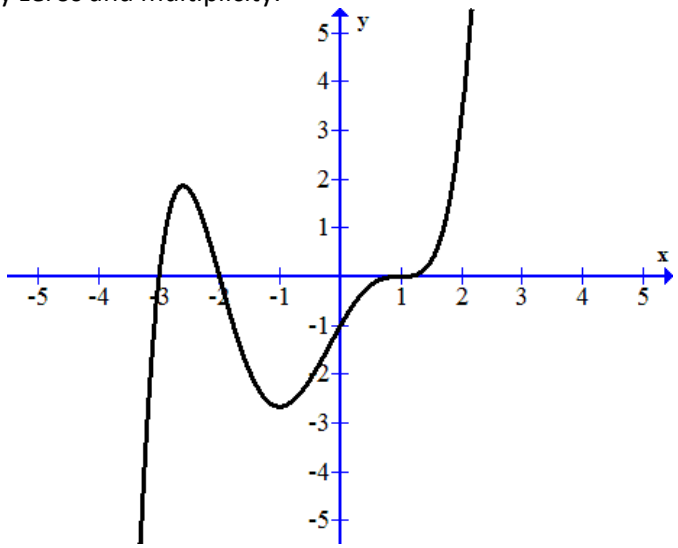
Use the graph to identify zeros and multiplicity.




***Solution***

The zeros of a polynomial are the values of $x$ where $y = 0$. They occur where the graph crosses the x-axis. This graph crosses the x-axis at $x = -3$, $x = -2$, and $x = 1$, so those are the zeros of this polynomial.

| Zero | Multiplicity |
|---|---|
| X = -3 | |
| X = -2 | |
| X = 1 | |

The multiplicity of a zero can be determined by the characteristics of the graph as it passes through the zero. If the graph of the polynomial passes straight through the zero looking like a line, the multiplicity of the zero is one. If the graph of the polynomial passes through the zero and then goes back in the same direction that it came from, looking like a parabola, the multiplicity is two. If the graph of the polynomial flattens out as it passes through the zero, looking like a cubic function, the multiplicity is 3.

Looking at the graph of this polynomial we can see that the graph passes straight through the zero at $x = -3$ and $x = -2$, so the multiplicity at those two zeros is one. The graph flattens out as it passes through the zero at $x = 1$, so the multiplicity at that zero is three.

| Zero | Multiplicity |
|---|---|
| X = -3 | 1 |
| X = -2 | 1 |
| X = 1 | 3 |