7-2 Graphing Polynomial Functions
End Behavior

Using a graphing calculator find the end behavior of the following functions. Where do the ends go?

Function	Domain	Range	End Behavior
$f(x) = x^2$			As $x \to +\infty$, $f(x) \to \square$. As $x \to -\infty$, $f(x) \to \square$.
$f(x) = x^4$			As $x \to +\infty$, $f(x) \to \square$. As $x \to -\infty$, $f(x) \to \square$.
$f(x) = x^6$			As $x \to +\infty$, $f(x) \to \square$. As $x \to -\infty$, $f(x) \to \square$.

Does it change if I have a negative coefficient? How?

End Behavior

Using a graphing calculator find the end behavior of the following functions. Where do the ends go?

Function	Domain	Range	End Behavior
$f(x) = x$			As $x \to +\infty$, $f(x) \to \square$. As $x \to -\infty$, $f(x) \to \square$.
$f(x) = x^3$			As $x \to +\infty$, $f(x) \to \square$. As $x \to -\infty$, $f(x) \to \square$.
$f(x) = x^5$			As $x \to +\infty$, $f(x) \to \square$. As $x \to -\infty$, $f(x) \to \square$.

Does it change if I have a negative coefficient? How?

Multiplicity

The **power** of the factor determines the nature of the intersection at the point $x = a$.
(This is referred to as the multiplicity.)

Straight intersection:
$(x - a)^1$ The power of the zero is 1.

Tangent intersection :
$(x - a)^{even}$ The power of the zero is even.

Inflection intersection: (like a slide through)
$(x - a)^{odd}$ The power of the zero is odd.

Graph on a calculator and state the factors, zeros, multiplicity at each zero, extrema

$f(x)=x^3$

$f(x)=x^2(x-2)$

$f(x)=x(x-2)(x+2)$

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Graph the function

$$g(x) = -(x-4)(x-1)(x+1)(x+2)$$

Write a function in intercept form for the given graphs whose intercepts are integers. Assume the constant factor of a is either 1 or -1.