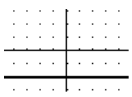
2.2 Polynomial Functions of Higher Degree

- Use transformations to sketch graphs of polynomial functions
- Determine end behavior by looking at the leading coefficient
- Find and use zeros of polynomial functions as sketching aids

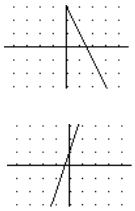
Here are some graphs of polynomial functions:

Zeros End Behavior Leading coefficient y-intercept

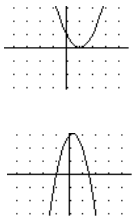
Constant function



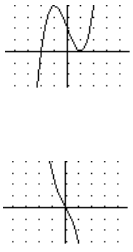
Linear function



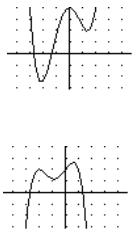
Quadratic function



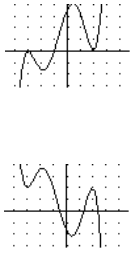
Cubic function



Quartic function



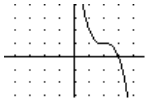
Other polynomial functions



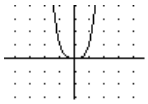
Transformations of higher degree polynomial functions.

If this is $y = x^3$

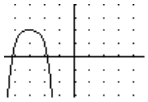
then what is this?



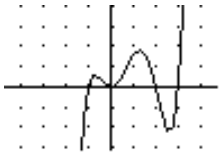
If this is $y = x^4$

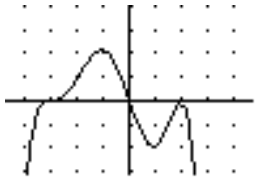


then what is this?



Guess at these:

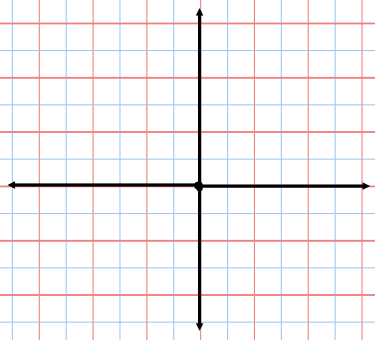




Sketching graphs of polynomial functions

If the polynomial factors:
- factor it
- place roots
- y-intercept
- end behavior

$f(x) = x^4 - x^3 - 20x^2$



$f(x) = x^3 - 3x + 1$

If it does not factor:
- end behavior
- y- intercept
- estimate some points

$x = -2 \quad y = (-2)^3 - 3(-2) + 1$

$x = -1 \quad y = (-1)^3 - 3(-1) + 1$

$x = 0 \quad y = 0^3 - 30 + 1$

$x = 1 \quad y = 1^3 - 3(1) + 1$

$x = 2 \quad y = 2^3 - 3(2) + 1$