

4.2 Polynomial Fns

- Polynomials have whole # exponents
↳ 0, 1, 2, 3, ...

Ex: $3x^2 - 5x + 4$

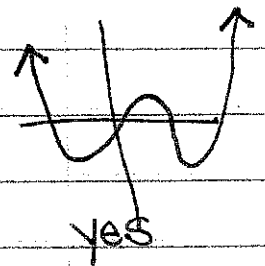
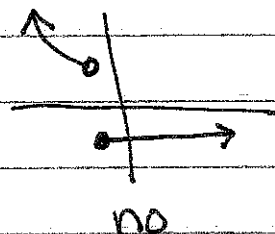
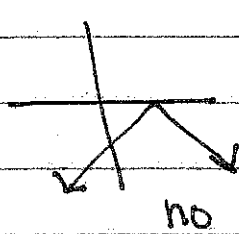
$\frac{5}{7}x^3 + \pi x^2 + 8.1$

Not polynomials: \sqrt{x} , $\frac{1}{x}$

Polynomial Graphs:

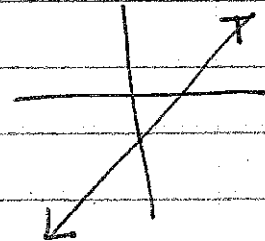
- Smooth (no sharp turns)
- Continuous

Polynomials?



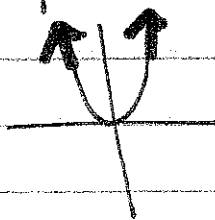
Degree 1: "Linear"

$y = 3x$, $y = \frac{5}{4}x + 2$

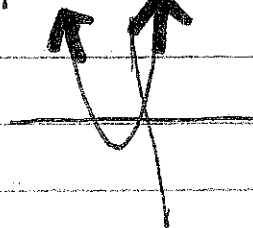


Degree 2: "Quadratic"

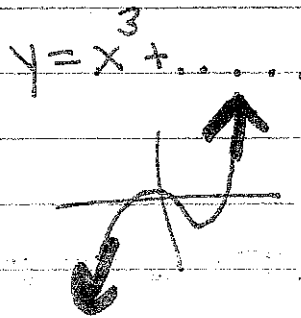
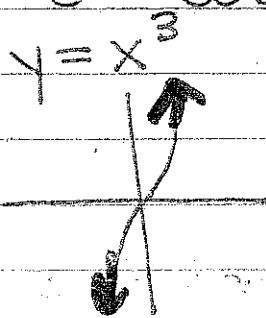
$y = x^2$



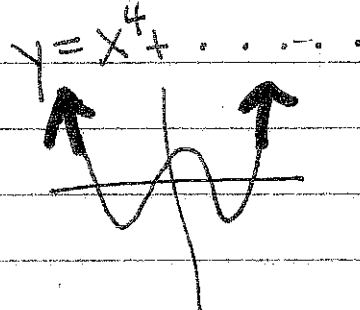
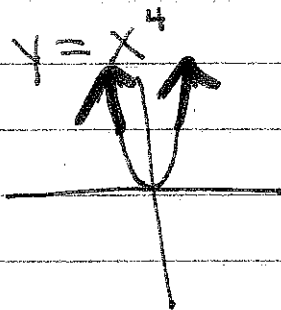
$y = 3x^2 + 5x + 1$



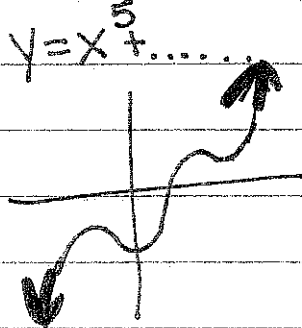
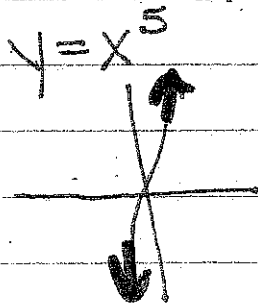
Degree 3: "Cubic"



Degree 4: "Quartic"



Degree 5: "Quintic"



Ex: $y = (x+2)(x-1)(x+4) = x^3 + \dots - 8$

- Degree = 3

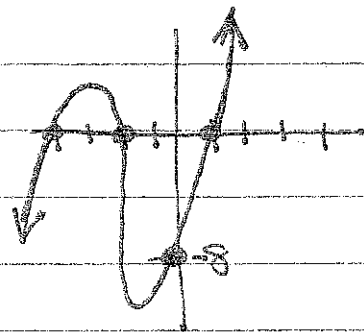
- End behavior ↙ ↗

$x = -2, +1, +4$

- x-int(s) $0 = (x+2)(x-1)(x+4)$

- y-int $y = (0+2)(0-1)(0+4) = 2 \cdot -1 \cdot 4 = -8$

- Graph



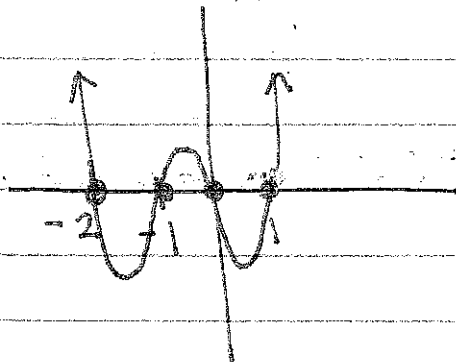
Ex: $y = x(x-2)(x-1)(x+1)$

Deg: 4

End behavior: $\uparrow \uparrow$

x-int: 0, -2, 1, -1

y-int: 0



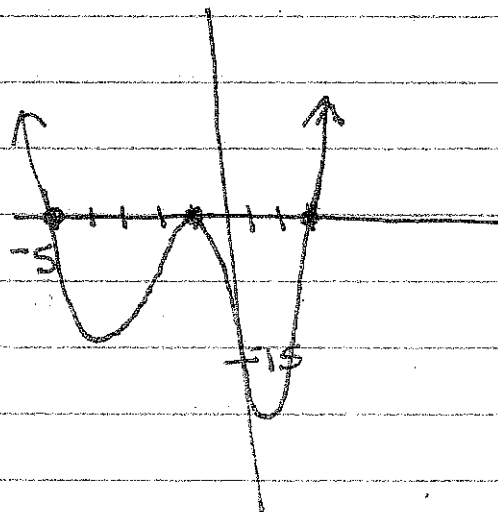
Ex: $y = (x-3)(x+1)^2(x+5)$

Deg: 4

End behavior: $\uparrow \uparrow$

x-int: 3, -5, -1*

y-int: $-3 \cdot 1^2 \cdot 5 = -15$



even multiplicity!
Bounce.

