Bellwork:

Local Max/Min?

(-1, 8) (-5, -5.5) (3, 0)

Zeros?

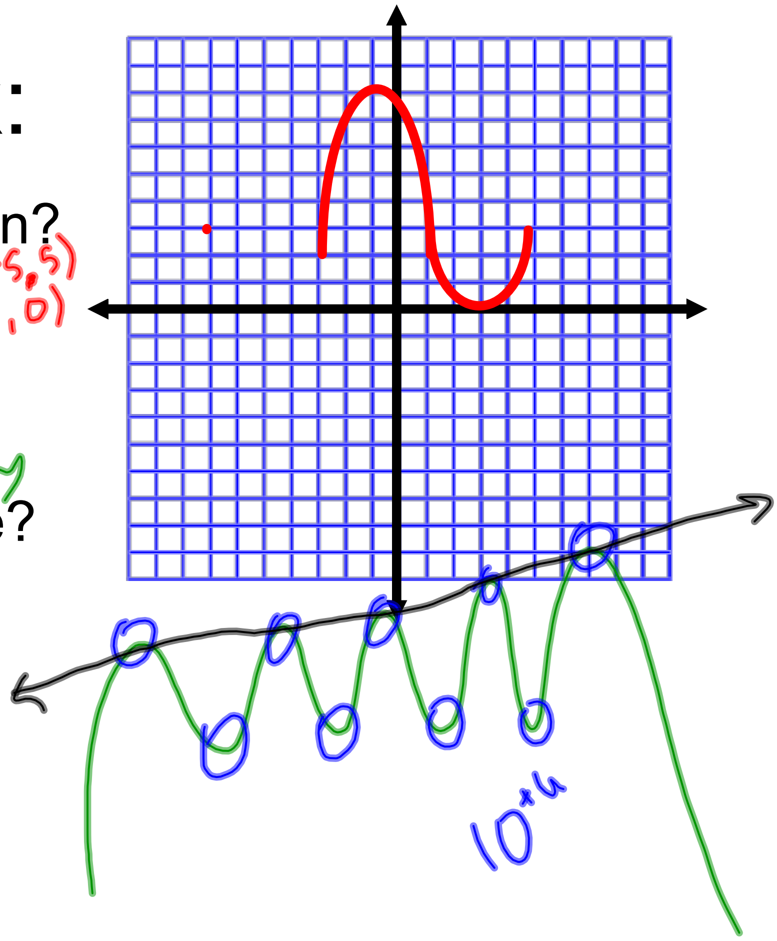
-7, -3, 3, 3

Turning Pts?

3 turning

Least Degree?

4th



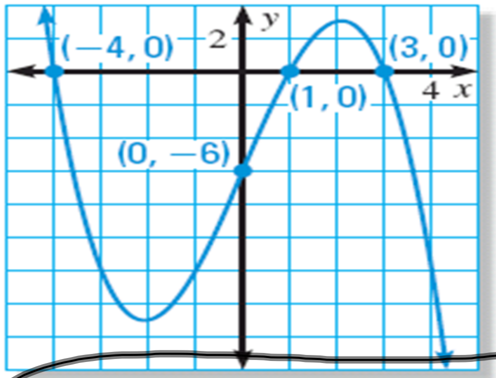
Chapter 5.9: Write Polynomial Functions and Models

line --- 2 pts to get equation

parabola --- 3 pts to get equation

cubic --- 4pts for equation

ex. Write the cubic function whose graph is shown.



$f(x) = a(x-k)(x-k)(x-k)$

$f(x) = a(x+4)(x-3)(x-1)$

$-6 = a(0+4)(0-3)(0-1)$

$-6 = a(4)(-3)(-1)$

$-6 = 12a \qquad a = -\frac{1}{2}$

$$\boxed{f(x) = -\frac{1}{2}(x+4)(x-3)(x-1)}$$

Finite Differences....

Subtracting values in a given sequence or series. This helps use form equations for the given numbers

1, 4, 9, 16, 25, 36, ...

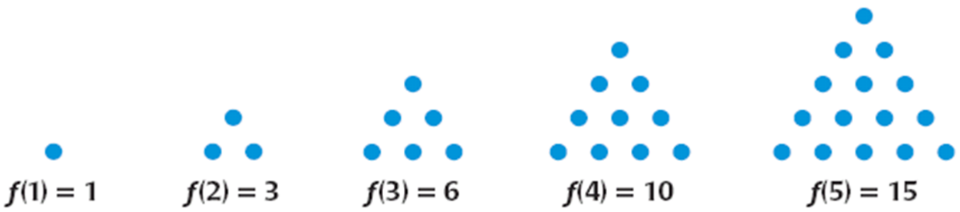
3 5 7 9 11

2 2 2 2

2nd-degree

$f(x) = x^2$

ex. The first 5 triangular numbers are shown below. A formula for the nth triangular number is $f(x)=\frac{1}{2}\left(n^2+n\right)$. show that this function has a constant second-order difference.



1, 3, 6, 10, 15, . . .

2 3 4 5

1 1 1

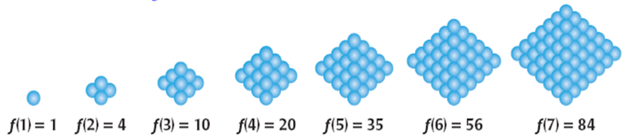
2nd order

Properties of Finite Differences:

- If a polynomial has degree n, then the nth order differences are constant

- Conversely, if the nth order is constant then its an nth degree.

The first seven triangular pyramidal numbers are shown. Find a polynomial function that gives the nth triangular pyramidal number.



1, 4, 10, 20, 35, 56, 84

3 6 10 15 21 28

3 4 5 6 7

1 1 1 1

x	1	2	3	4	5	6	7
f(x)	1	4	10	20	35	56	84

$$f(x) = \frac{1}{6}x^3 + \frac{1}{2}x^2 + \frac{1}{3}x + 0$$

ex. find the polynomial that best fits the data.

x	10	20	30	40	50	60	70	80
y	202.4	463.3	748.2	979.3	1186.3	1421.3	1795.4	2283.5

Homework: Ch 5.9 pg.397 #'s 4-20e