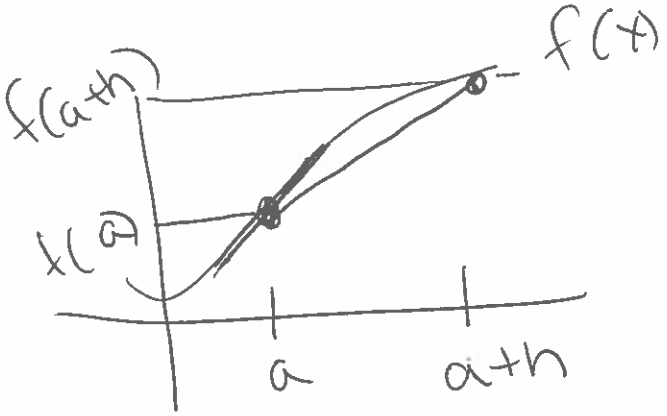
Instaneous Rate of Change

Two Data → one.



$$m_{ave} = \frac{\Delta y}{\Delta x} = \frac{f(a+h) - f(a)}{h}$$ TWO POINTS

m_{tan} (x = a) ONE POINT "a"

$$\lim_{h \to 0} \frac{f(a+h) - f(a)}{h} =$$

Definition Derivative

$f'(a)$ $\left.\frac{dy}{dx}\right|_{x=a}$ $D_x(a)$

Derivate at a point

$f'(a)$

or

Derivate as a function

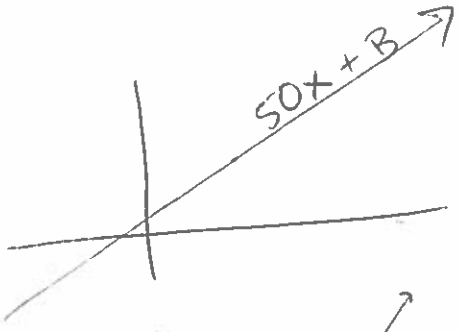
$f'(x)$

$f(x) = C$

$f'(x) = 0$

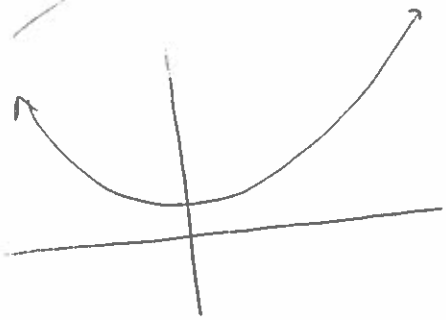
$f(x) = Ax + B$

$f'(x) = A$



$f(x) = Ax^2 + Bx + C$

$f'(x) =$



$$f'(x) = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$$

$$f(x) = Ax^2 + Bx + C$$

$$f(x+h) = A(x+h)^2 + B(x+h) + C$$

$$Ax^2 + 2Axh + Ah^2 + Bx + Bh + C$$

$$f(x) = Ax^2 + Bx + C$$

$$\frac{f(x+h) - f(x)}{h} = \frac{2Axh + Ah^2 + Bh}{h}$$

$$= 2Ax + Ah + B$$

$$f'(x) = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h} = \lim_{h \to 0} 2Ax + \cancel{Ah}^{0} + B$$

$$= 2Ax + B$$

GROUP NAME: Porter's minions

Date: 2/6/14

Student Names (First and Last)

Speaker/Presenter: Jason/Dallon

Writer/Prep: Jen

Leader/Collaborator: Daniella/Kero

Independant Variable (x-axis): years

Dependant Variable (y-axis): international student tuition $

Conclusion (in words):

with the quartic regression, in 2014 tuition is going up by $91.

Supporting Work:

$Y_1 = 50$

$Y_2 = 2 * 17.85...x + -378.57...$

$Y_3 = 3 * 0x^2 + 2 * 17.85...x + -378.57...$

$Y_4 = 4 * -2.08...x^3 + 3 * 99.99...x^2 + 2 * -1772.91...x + 13799.99...$

$Y_5 = nDeriv(-2.08x^4 + 99.99...x^3 + -1772.91...x^2 + 13799.99...x + -36574.99..., X, X)$

X	Y_1	Y_2	Y_3	Y_4	Y_5
14	50	121.43	121.43	91.667	91.667
13	50	85.714	85.714	95.833	95.833
12	50	50	50	50	50
11	50	14.286	14.286	4.1667	4.1667
10	50	-21.43	-21.43	8.3333	8.3333

GROUP NAME: Fluffy Ponies 

Date: 2/6/14

Student Names (First and Last)

Speaker/Presenter: Milton/Ahmed

Writer/Prep: Courtney

Leader/Collaborator: Tyler/June

Independant Variable (x-axis): income

Dependant Variable (y-axis): crime rate

Conclusion (in words):

At 70K, Crime rate is increasing by .25% (according to the quart reg or y_4) per dollar thousand

Supporting Work:

$y_1 = .0011$

$y_2 = 2 \times 1.857142857142857 \times 10^{-4} x + .023385714285714$

$y_3 = 3 \times 4.166666666666652 \times 10^{-7} x^2 + 2 \times 1.107142857142857 \times 10^{-4} x + .019452380952381$

$y_4 = 4 \times 1.041666666666813 \times 10^{-8} x^3 + 3 \times 2.916666666667016 \times 10^{-6} x^2 + 2 \times -9.555333333333362 \times 10^{-5} x + .012666666666666572$

$y_5 = nDeriv(y_4, x, x)$

x	y_1	y_2	y_3	y_4	y_5
70	.0011	.00261	.00217	.0025	0025
80				.00667	
93				.01167	
180				-.0067	

GROUP NAME: World Health Organization

Date: 2/6/14

Student Names (First and Last)

Speaker/Presenter: Mike Vetick, Charles

Writer/Prep: Jenna Giardello

Leader/Collaborator: Cathryn Jolley, Kathleen

Independant Variable (x-axis): time

Dependant Variable (y-axis): steroid level in food in babies

Conclusion (in words): when in the future (2022) the steroid levels of our kids will be increasing by 6.53 ppm/yr when evaluated x^1, ~~-57.47~~ when evaluated x^2, $-5.7e^6$ ppm/yr when x^3, $-8.5e^8$ ppm/yr when evaluated x^4.

Supporting Work:

Derivatives

y1 = 6.5333333333333

y2 = 2* -0.015873015873015X + 6.723809523809525

y3 = 3* -0.46913580246916 X^2 + 2* 8.428571428571 9 X^1 + -29.587301587303

y4 = 4* -0.0257201646090 11 X^3 + 3* 0.148148148148 65X^2 + 2* 3.898148148137 5 X^1 + -19.666666666666 45

y5 = nDeriv(-0.0257201646090 11 X^4 + 0.148148148148 65X^3 + 3.898148148 1315X^2 + -19.666666666666 45X + 122,X,X)

Data

Time	Steroid level in food in babies
2000	122 ppm
2003	100 ppm
2006	143 ppm
2009	200 ppm
2012	170 ppm