Math 211-2015S-W1-Wed

Review - List of concepts

Function (mapping, correspondence)
domain and range
vertical line test

intercepts

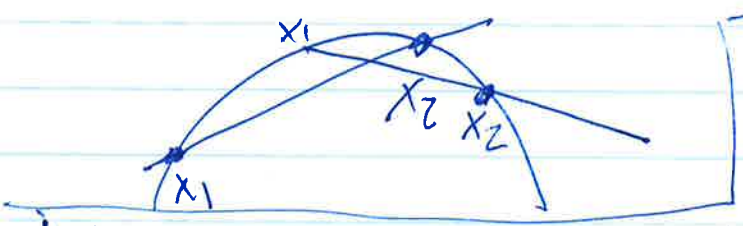
increasing and decreasing functions

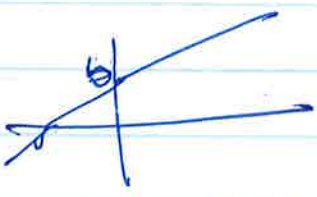
linear functions $F(x) = mx + b$
slope $= m =$ rise/run $= \frac{\Delta y}{\Delta x} = \frac{F(x_2) - F(x_1)}{x_2 - x_1}$

difference quotient

* For a line the difference quotient does not depend on x_1 and x_2

* For a curved function the difference quotient is still the slope of a line connecting two points, However this slope changes





Intercept of a line is $\underline{b}$ in $y = mx + b$

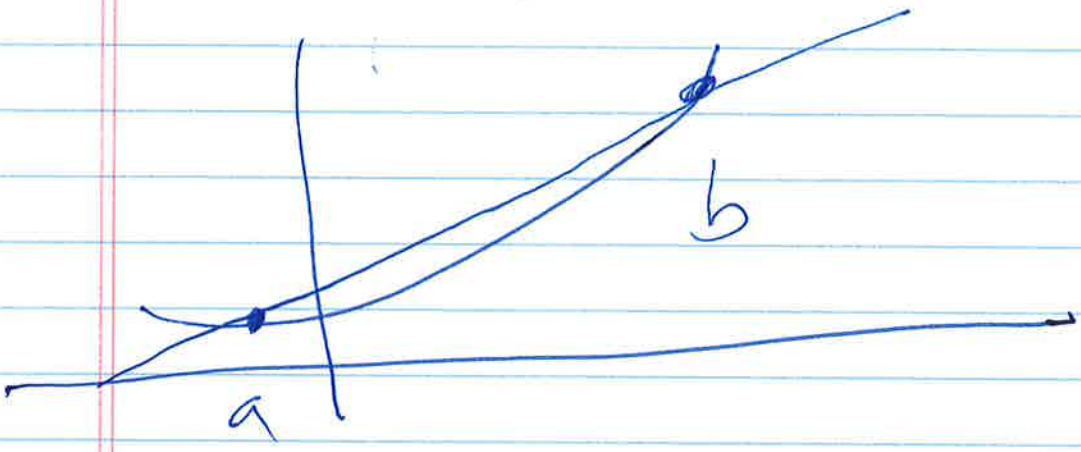
1.3

For curved functions the difference quotient is called the average rate of change between a and b

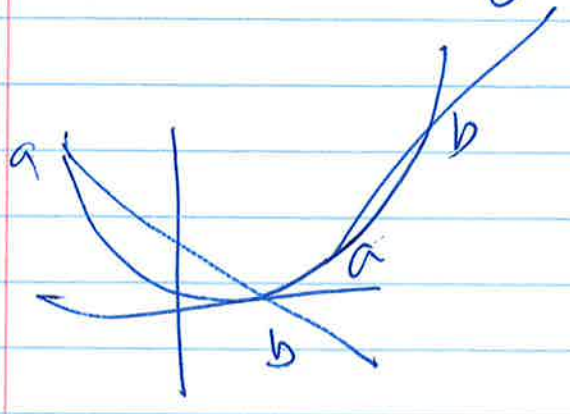
$$\frac{\Delta y}{\Delta t} = \frac{f(b) - f(a)}{b - a}$$

often we use t for the independent variable

here we have used a and b instead of x_1 and x_2



Average rate of change is slope of line connecting a and b.



Obviously this can change for curved functions

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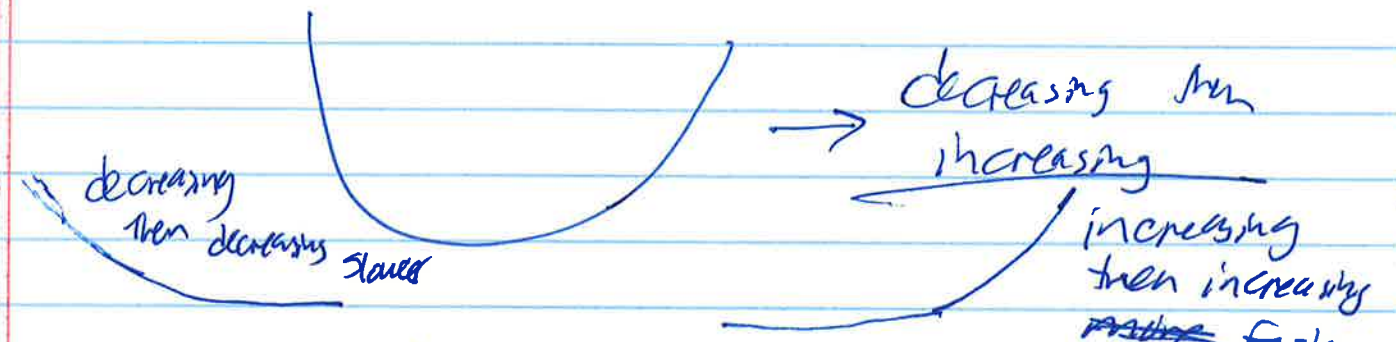
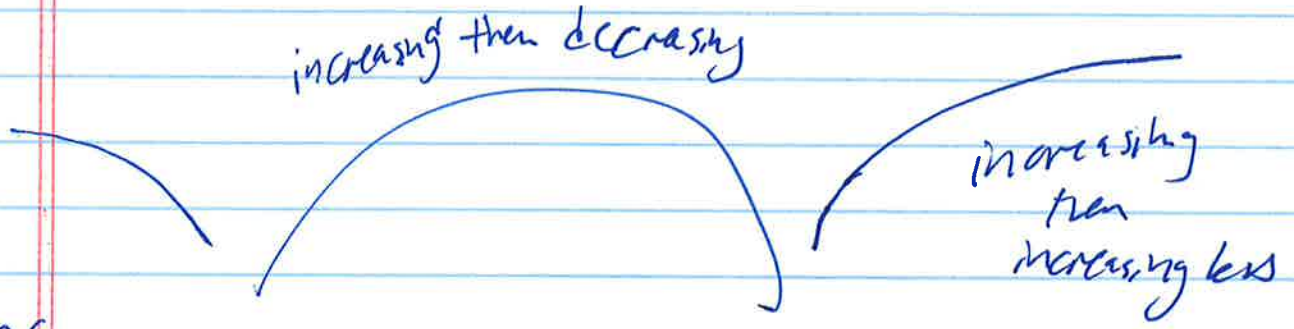
Concavity

Those are concave up functions



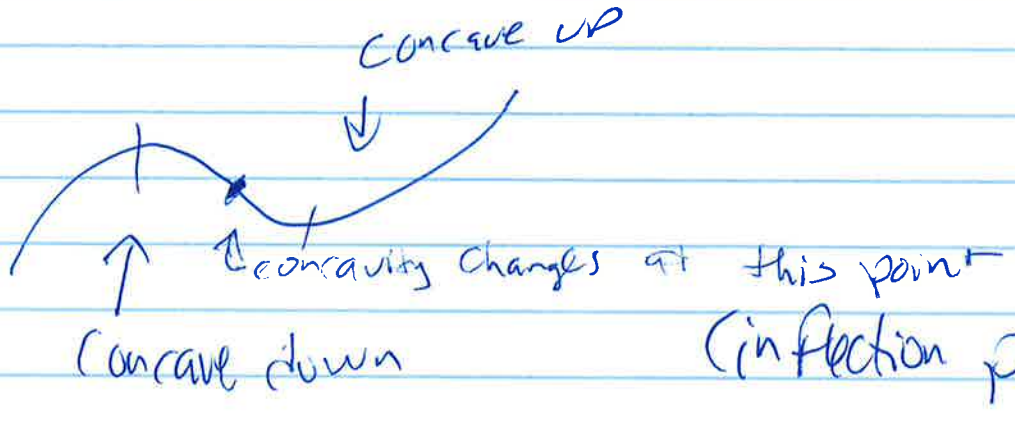
Smiles

Those are a concave down functions



frowns

This is a fuction whose concavity changes



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Relative Change

If the population increases by 1000 people

It is a big change for Coyote NM (pop 1559)

Not so big for NYC (pop 8,250,000 when 4th ed published)

The Relative change measures this. When P changes from P_0 to P_1:

$$\text{Relative change in } P = \frac{\text{Change in } P}{P_0}$$

$$= \frac{P_1 - P_0}{P_0}$$

Coyote $\frac{1000}{1559} = 0.641$ or 64.1%

NYC $\frac{1000}{8,250,000} = 0.00012$ or 0.012%