

Good afternoon: have your AP mult choice q's out when the bell rings, submit your answers here:

<http://bit.ly/apcalcext>



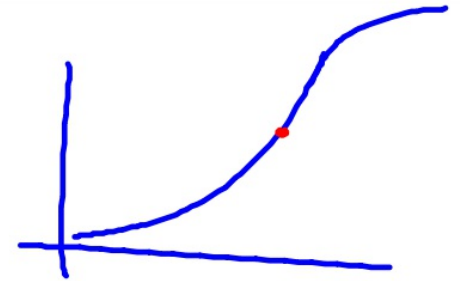
reminders

- assessing Friday
- I will be available after school Monday for retakes

Simplified Takeaway from Monday

F is concave up when  $f''$  is positive

F is concave down when  $f''$  is negative



F has an inflection point where  $f'' = 0$  (or undefined)

AND changes sign

Change in  
Concavity

GARFIELD

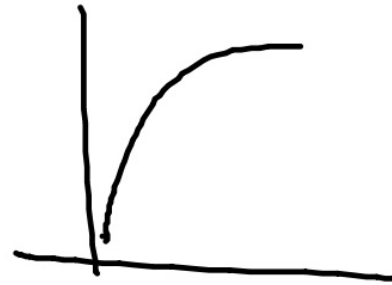


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$$W(t)$$

$$\cancel{W'(t) < 0}$$

$$W''(t) < 0$$



# Atlanta Journal Constitution

13 DEC 2017

## Torrid school enrollment rates cool off

By AUTHOR

...tiable desire for the creatures. The increase in Beijing-Ulanbataar trade is anticipated to relieve pressure on the relatively strained Russian suppliers, but increase Mongolia's imbalance of trade with its larger neighbour.

Historically the only competitor to China in the far eastern, moose

year's figures. NASA stunned the scientific community today with the announcement of their discovery that the moon is significantly smaller than previously believed. This conclusion, which is the conclusion of a year collaborative project, will have profound implications for the

$$\begin{aligned} E(t) &> 0 & E''(t) &< 0 \\ E'(t) &> 0 \end{aligned}$$

# Pace Of U.S. Health Spending Slows In 2016

By Phil Galewitz  
DECEMBER 6, 2017

 [REPUBLISH THIS STORY](#)



## Chattanooga among top 25 cities for job growth this year

Employment in the Chattanooga area this year is growing more than three times as fast as the rest of the country, placing Chattanooga among the top cities for job growth in 2017, according to a new [study of employment trends by the web site 24/7 Wall Street](#).

From January through October, employers in the six-county Chattanooga metropolitan area added 9,377 net new jobs, boosting overall employment in the region by 3.8 percent. That ranked as the 21st best rate of job growth among all 388 metropolitan cities in the United States.

Chattanooga was among four Tennessee metro areas among the top 10 metro areas for job growth in the South so far in 2017. Overall, Tennessee's jobless rate fell this fall to 3 percent — the lowest level on record — and Chattanooga's unemployment rate fell in October to 3.5 percent — one of the lowest months in the past two decades.

## News

- Latest news
- News by topic
- HIV update
- News feeds
- Conference news

### DELIVERY OF CARE

# Decline in mortality rate amongst people with HIV has slowed in recent years

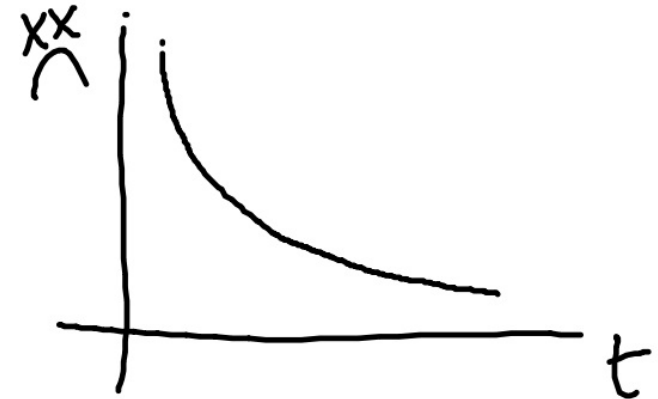
- Print
- Email

Tweet

Michael Carter

Published: 02 October 2007

A study conducted by US investigators has found that although mortality has declined significantly in HIV-positive patients since the introduction of effective anti-HIV therapy, the rate of this decline has slowed in recent years. Their study, published in the October edition of *AIDS* also showed that noninfectious diseases, like heart and liver disease, are an increasingly important cause of death in



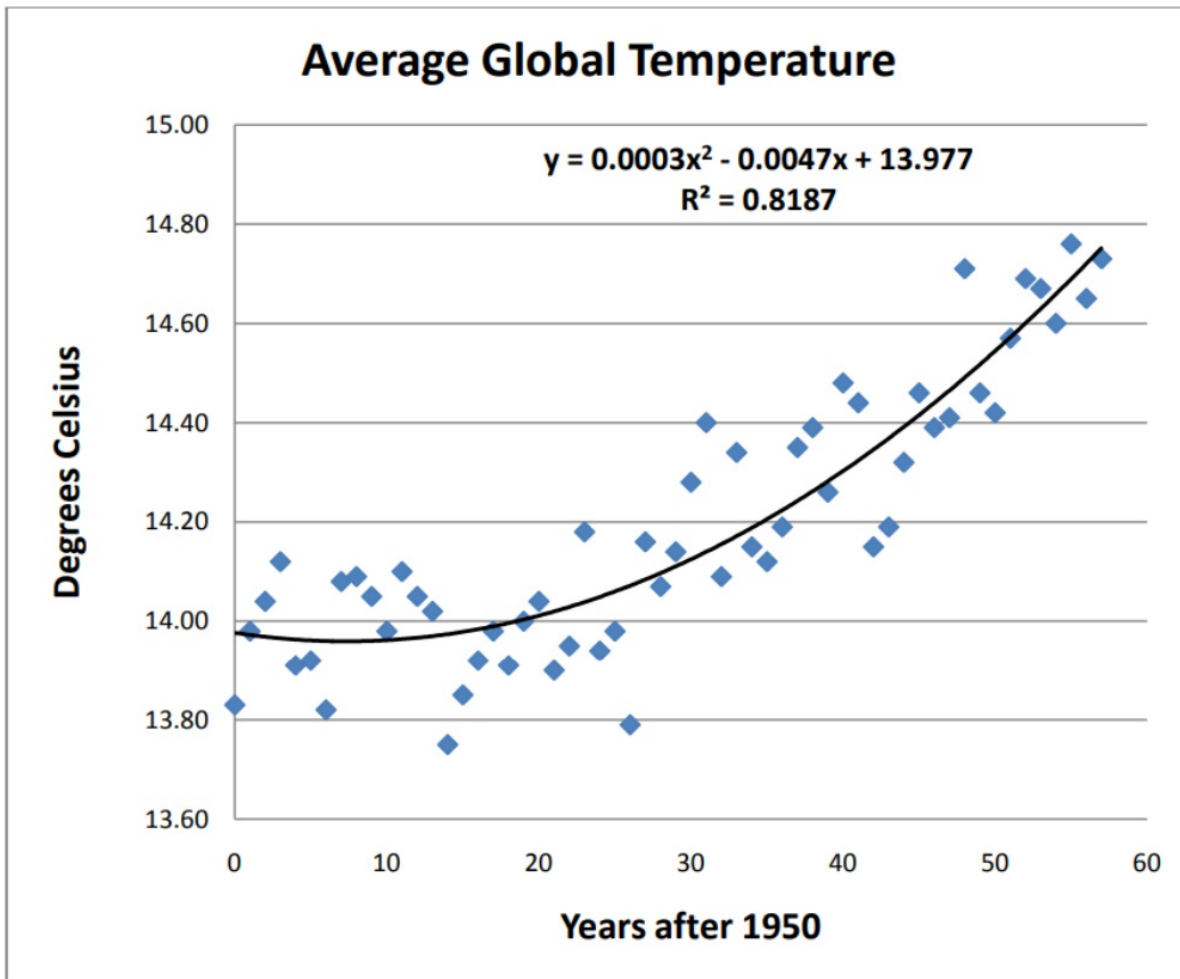
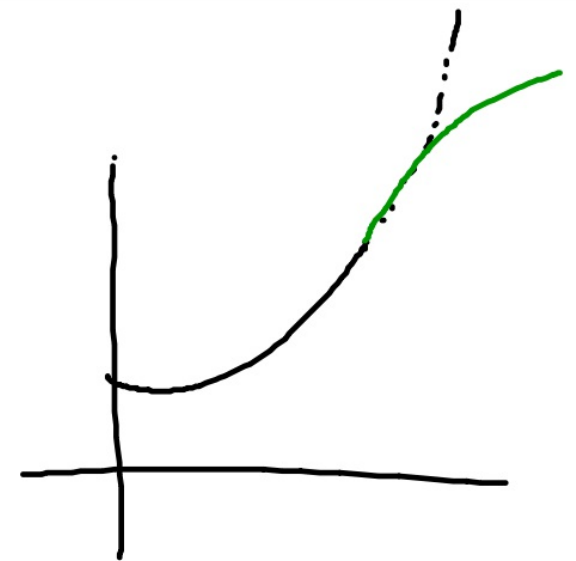


Figure 1 A scatter plot to and a quadratic fit to average global temperature data.





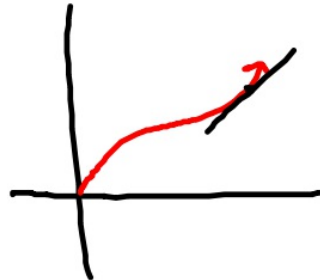
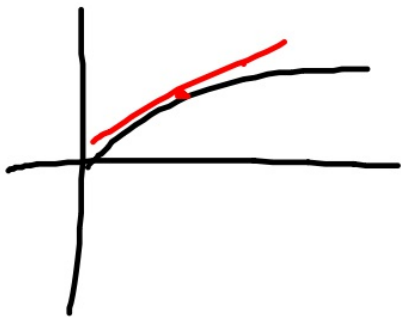
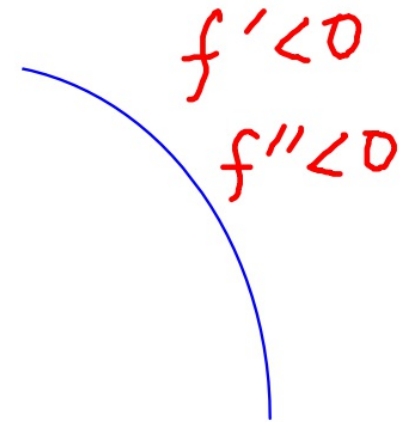
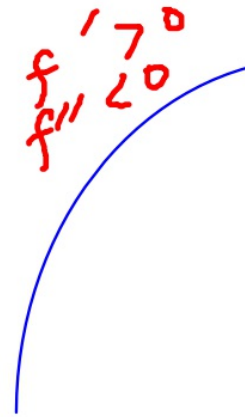
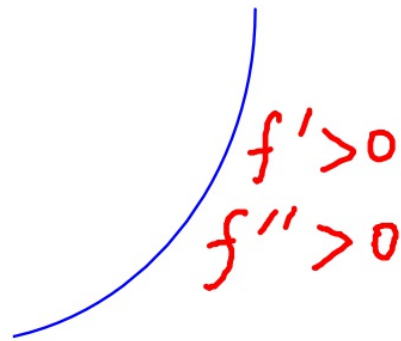
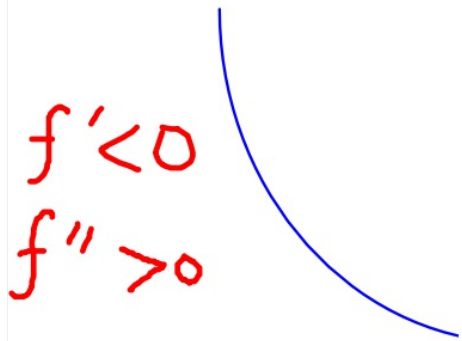
SHOE



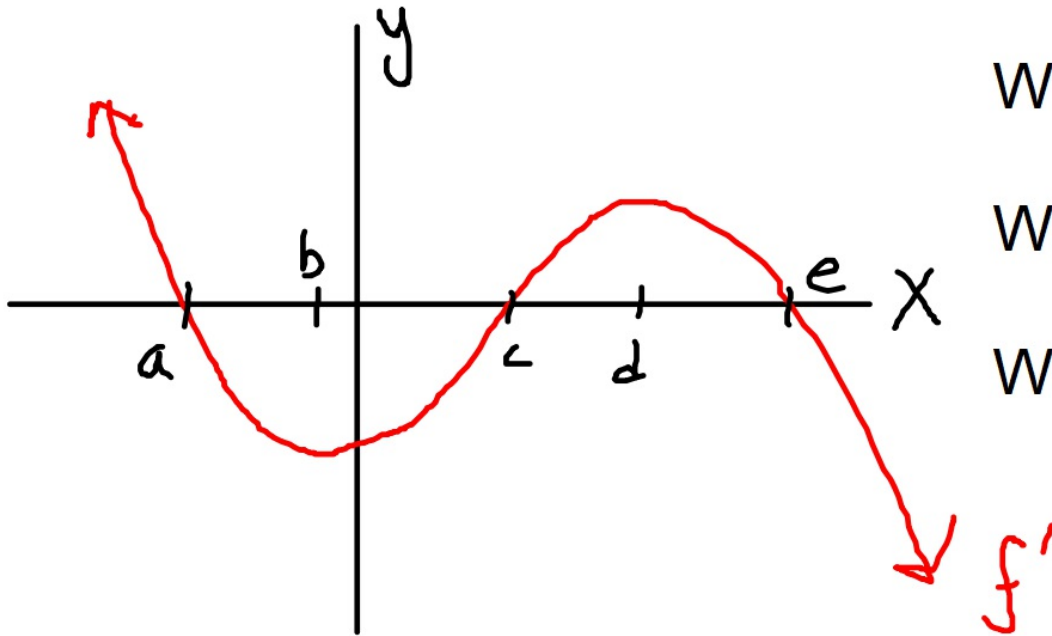
(Used with permission of Chris Cassatt)



# Tangent Lines, Concavity, and Approximations



## Reading a Derivative Graph



Where does  $f$  have a rel max?

$a, e$

Where does  $f$  have a rel min?

$c$

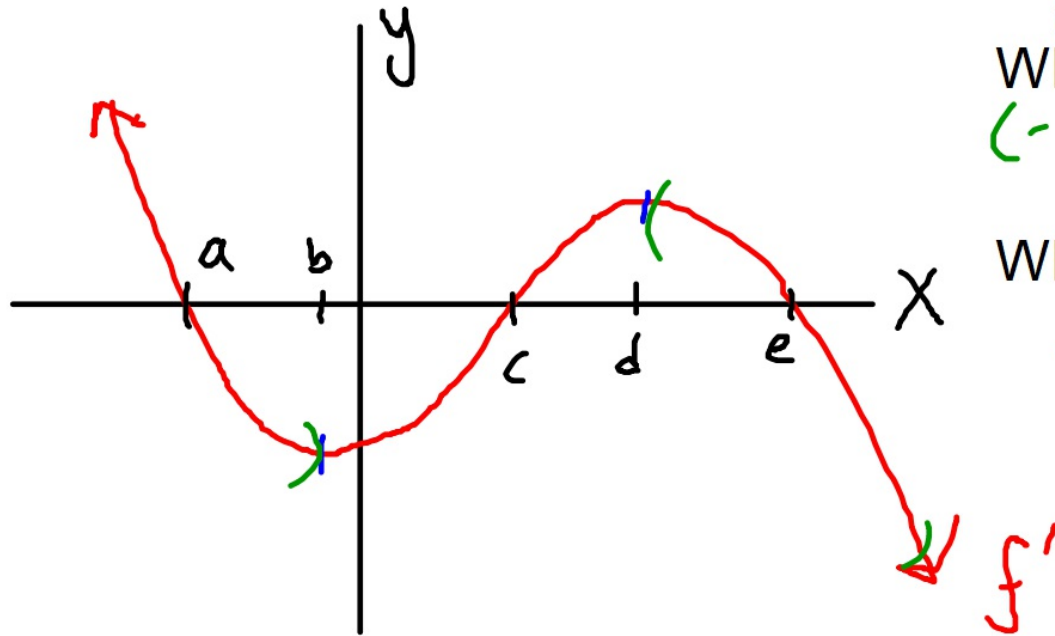
Where is  $f$  increasing?

$(-\infty, a), (c, e)$

Where is  $f$  decreasing?

$(a, c), (e, \infty)$

## Reading an Derivative Graph



Where is  $f$  concave up?

$(b, d)$  b/c  $f'' > 0$   
 $f'$  increasing

Where is  $f$  concave down?

$(-\infty, b)$   $(d, \infty)$

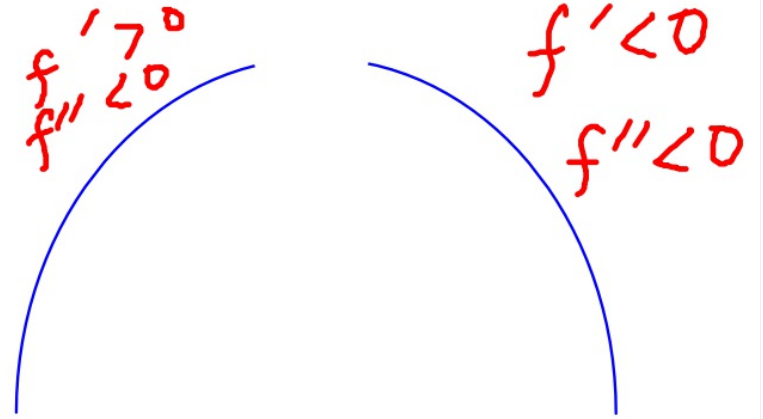
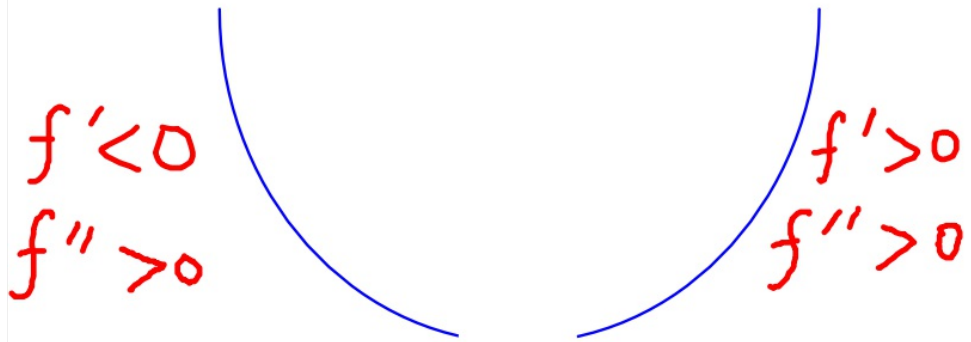
b/c  $f'$  decreasing

Where does  $f$  have inflection pts?

$b$  &  $d$  b/c  $f'' = 0$

and a change in  
 concavity.

## The Four Kinds of Curvature



Describe the nature of the curvature at  $x=1/4$  for  $f(x) = -x^3 + 2x^2 - x$

"At  $\frac{1}{4}$ , does  $f$  look like ?"

C.N.

$$f'(x) = -3x^2 + 4x - 1 = 0$$

$$-1(3x^2 - 4x + 1) = 0$$

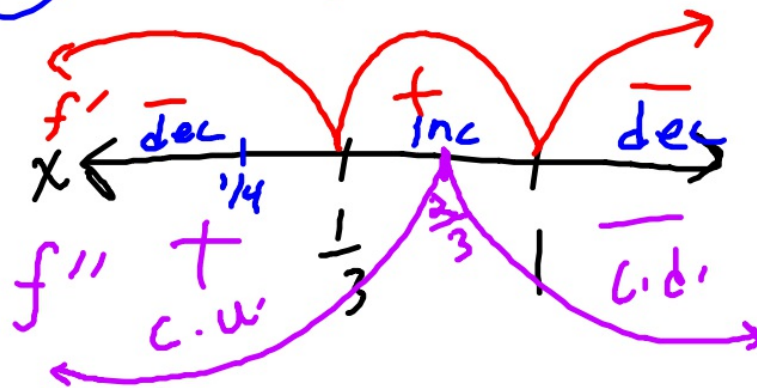
$$-1(3x-1)(x-1) = 0$$

$$x = \frac{1}{3} \quad x = 1$$

T.P.

$$f''(x) = -6x + 4 = 0$$

$$x = \frac{2}{3}$$



at  $x = \frac{1}{4}$ ,  
 $f$  is dec., c.u.

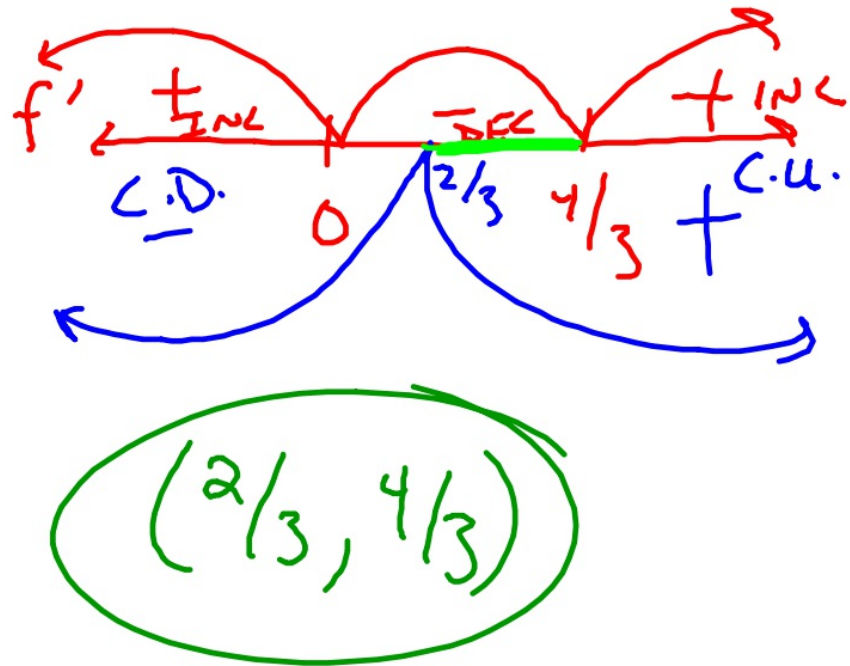
Give any intervals where the function is decreasing and concave up  
 $f(x) = x^3 - 2x^2$

$$f'(x) = 3x^2 - 4x = 0$$
$$x(3x - 4) = 0$$

↙                  ↘

$$\frac{x=0}{\text{C.N.}} \qquad \qquad \frac{x=4/3}{\text{C.N.}}$$

$$f''(x) = 6x - 4 = 0$$
$$\frac{x=2/3}{\text{T.P.}}$$



## Practice Assessment

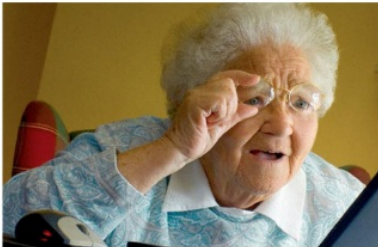


D-AD10: Reading a first deriv. graph for concavity and IP

D-AD11: finding inflection points

D-AD12: finding intervals of concave up/down

D-AD13: finding the type of curvature (inc/dec AND cu/cd)



D-AD7: Reading a first deriv. graph for inc/dec and extrem

D-AD8: finding absolute and relative extrema

D-AD9: finding intervals of inc/dec