Grade your own (in pen). Each problem is worth 2 points, for a total of 10 points. Turn in corrections on a new sheet of paper by tomorrow (Friday). Corrections must display all work.

1) $125^{-2v-3} = 625^{-2v}$

$\left\{\frac{9}{2}\right\}$

5) $7 \cdot e^{x-2} = 53$

4.0244

9) $\log_4 2x^2 - \log_4 2 = 2$

$\{4, -4\}$

One point for each

13) $\ln 4 - \ln(x-1) = \ln 24$

$\left\{\frac{7}{6}\right\}$

16) $\log_7 x - \log_7 (x+1) = 1$

No solution.

My Favorite Mistake...

Solve the equations algebraically. Round your results to 3 decimal places.

$$\frac{500e^{-x}}{500} = \frac{300}{500}$$

$$\ln e^{-x} = \ln \frac{3}{5}$$

$$\frac{-x}{-1} = \frac{\ln\left(\frac{3}{5}\right)}{-1}$$

$$x \approx .511$$

$$\log_4 x - \log_4 (x-1) = \frac{1}{2}$$

$$\log_4 \frac{x}{x-1} = \frac{1}{2}$$

$$4^{\frac{1}{2}} = \frac{x}{x-1}$$

$$(x-1)\,2 = \frac{x}{x-1} \cdot x-1$$

$$2x-2 = x$$

$$x = 2$$

$$\frac{500e^{-x}}{500} = \frac{300}{500}$$

$$e^{-x} = \frac{3}{5}$$

$$\ln e^{-x} = \ln 3/5$$

$$-x = -.511$$

$$\boxed{x = 0.511}$$

$$\log_4 x - \log_4 (x-1) = \frac{1}{2}$$

$$\log_4\left(\frac{x}{x-1}\right) = \frac{1}{2}$$

$$4^{1/2} = \frac{x}{x-1}$$

$$2 = \frac{x}{x-1}$$

$$2x - 2 = x$$

$$\boxed{x = 2}$$

3.5: Using Exponential and Log Equations to Model Data--very cool.

$$y = ae^{bx}$$

$A = Pe^{rt}$

//exponential growth

$y = ae^{bx}$

//exponential decay

$y = ae^{-bx}$

To find the "mother equation," you must find the values for a and b.

a= initial value

b= rate of growth or decay

Example | p. 233, #24

Find the exponential model $y=ae^{bx}$ that goes through the points (0, 1/2) and (4,5).

$\frac{1}{2}=ae^{b\cdot 0}$

$\frac{1}{2}=ae^{0}$

$\frac{1}{2}=a$

$y=\frac{1}{2}e^{bx}$

$5=\frac{1}{2}e^{4b}$

$\ln 10=\ln e^{4b}$

$\frac{\ln 10}{4}=\frac{4b}{4}$

$0.576=b$

$y=\frac{1}{2}e^{0.576x}$

Example | p. 233, #12 $y = ae^{bx}$

You invest $300 in a bank account and 10 years later you have a total of a whopping $385.21. What was the interest rate? How long will it take for your money to double?

Interest rate

$\frac{385.21}{300} = \frac{300e^{10b}}{300}$

$\ln 1.284 = \ln e^{10b}$

$\frac{\ln 1.284}{10} = \frac{10b}{10}$

$.025 = b$

2.5%

Double

$.025x$

$\frac{600}{300} = \frac{300e}{300}$

$\ln 2 = \ln e^{.025x}$

$\frac{\ln 2}{.025} = \frac{.025x}{.025}$

$x = 27.726$ yrs

p. 232, #9 (HW)

Example $y = ae^{bx}$

The radioactive element carbon-14 has a half-life of 5730 years. The percentage of carbon-14 present in the remains of plants and animals can be used to determine age. Archaeologists found that the linen wrapping from one of the Dead Sea Scrolls has lost 22.3% of its carbon-14. How old was the linen wrapping?

$100 - 22.3 = 77.7$

b — $b \cdot 5730$

$.5a = ae^{-5730b}$

$\ln .5 = \ln e^{-5730b}$

$\frac{\ln .5}{-5730} = \frac{-5730b}{-5730}$

$1.2097 \times 10^{-4} = b$

X — $1.2097 \times 10^{-4} X$

$.777a = ae^{-1.2097 \times 10^{-4} X}$

$\ln .777 = \ln e^{-1.2097 \times 10^{-4} X}$

$\ln .777 = -1.2097 \times 10^{-4} X$

$2085 \text{ yrs} = X$

p. 233, #21 (HW)

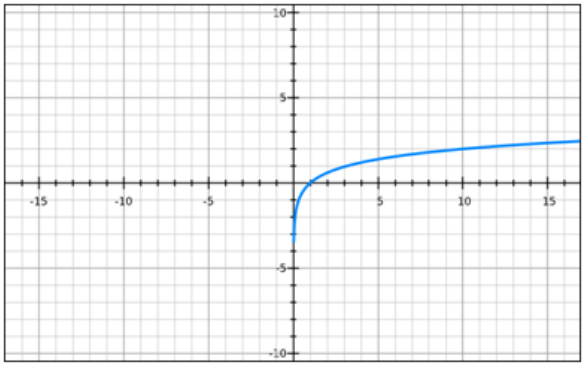
HOMEWORK

...apply that math!

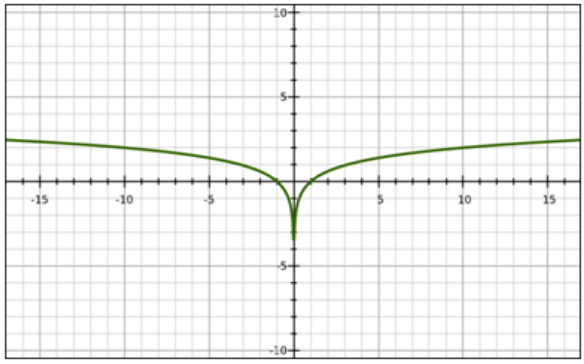
3.5 (p232): 7-15 odd; 19-25 odd, 29, 35, 39, 43

True or false: $\log x + \log x = \log x^2$

True or false: $\log x + \log x = \log x^2$



$f(x) = \log x + \log x$



$f(x) = \log x^2$

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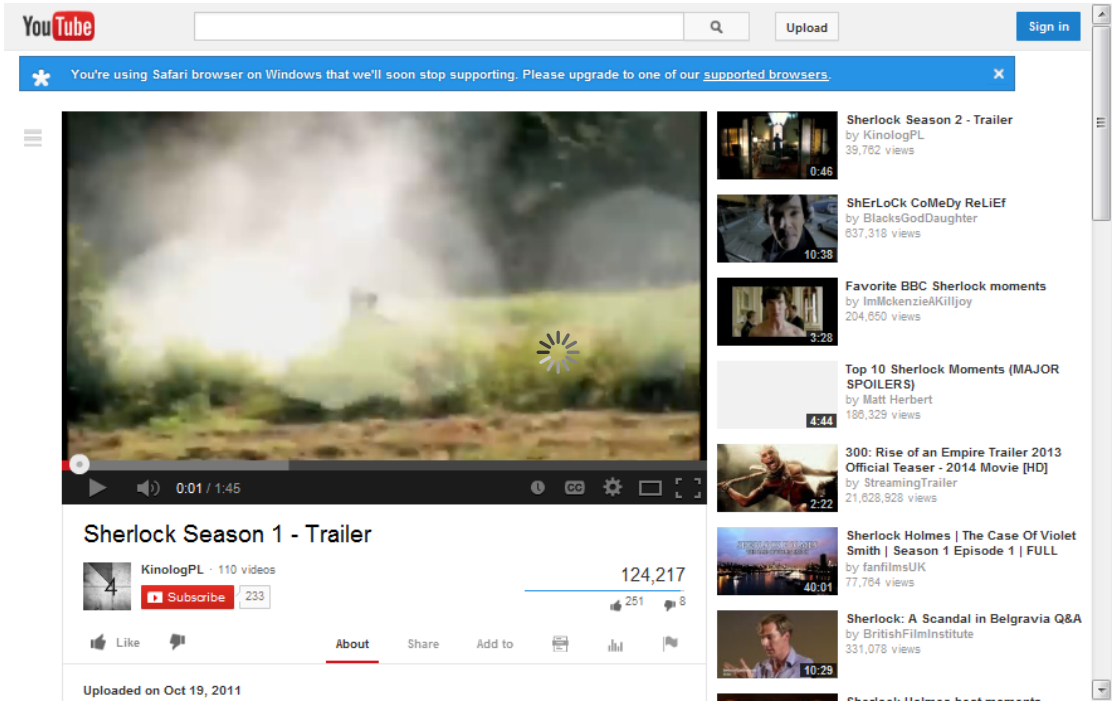
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Finish your version of the story on a Word document (each group only needs one post). Gold stars will be awarded for incorporating students, teachers, and/or principals. Gold stars will also be awarded if written in the original Sherlock Holmes style. I'm looking for high entertainment value here.

The first line of your story should give the title as well as the authors.
Save your document as the first name of each author as well as your hour.

Title: Sherlock Hearts Calculus by John Doe and Jane Smith
Save as: John and Jane 3rd hour

Any math should be centered and bolded:

T(t)=Ts+(Ts-T0)e^(-kt)

Posts must be submitted before Tuesday's class.

A sample writing: http://yep.it/hhmm where hhmm is the time of death.
For example, if the time of death is 8:45, then go to http//yep.it/0845

Criteria	Possible points
Identified correct time of death (to nearest quarter hour)	1
Identified correct murderer	1
Incorporated at least five lines of mathematics and formatted equations correctly	2
Entertainment Value	1
Total Points	5

$$T - T_s = (T_0 - T_s)e^{-kt}$$

"...when you have eliminated all which is impossible, then whatever remains, however improbable, must be the truth."

Sherlock Holmes Quote, The Blanched Soldier

Sample Work:
http://www.ncsec.org/team3/teachers/corpse.html