

version

Red

PRINT
NAME

Tardis

Math 34A Fall 2008
Prof Cooper

Final
no calculators

Quality
Bonus

SCORE

Put final answers in boxes on this page. **Show high quality** work in the blue book for all answers. Points may be awarded for this. **Number your solutions in the blue book.**

Happy Holidays

At the end of the exam place this page **INSIDE** the blue book, and then put the bluebook inside the envelope.

This student showed me their ID and it looks like them

Checker
Tardis

I could not tell
(poor light, no ID,...)

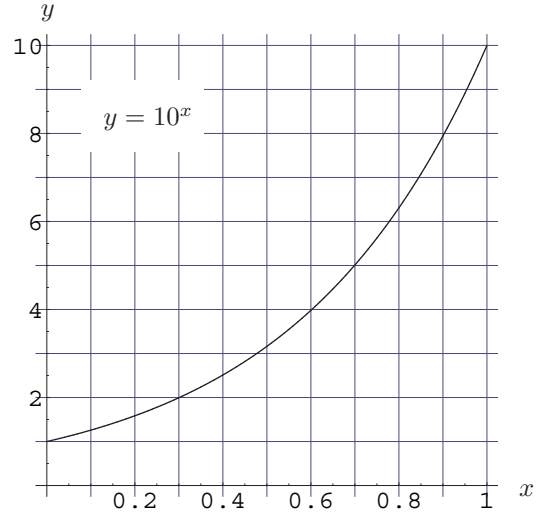
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(1) [/6] Use the graph given to find

(a) What is the slope of the graph at $x = 0.35$

[beware scales on the axes]

(b) What is average rate of change of 10^x between $x = 0.2$ and $x = 0.4$?



(2) [/6] Find the derivatives

(a) $\frac{d}{dx} ((ax - 7)^2)$

(b) $f(x) = kx^3 + 3$
find $f'(2)$

(c) $g(x) = 2e^{3x} + (5/x)$
find $g''(x)$

(4) [/6] $y = 2x^2 - 7x + 3$

(a) What is the slope of the graph at $x = 2$?

slope=

(b) What is the equation of the tangent line at $x = 2$?
[answer in form $y=mx+b$]

y=

(c) What value of x gives the minimum value of y ?

x=

(5) [/6] The height above the ground after t seconds of a rocket which is flying vertically upwards is $h(t) = 40t - 2t^2$ meters

(a) What is the speed of the rocket after 4 seconds ?

(b) What is the height of the rocket after 3 seconds ?

(c) How high did the rocket go?

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(6) [/6] A rectangular swimming pool is 5 meters wide and 40 meters long and 3 meters deep. Initially there is 1 meter of water in the bottom of the pool. Then water is pumped into the pool at a rate of 20000 liters per hour.

(a) What is the depth in meters of the water in the pool t hours after pumping starts ?

(b) How many hours of pumping until the pool is full?

(c) How many hours until the pool is half full (careful!)

[1 cubic meter equals 1000 liters]

(8) [/6] The table shows the number of miles a car has

hours	0	1	3	6	8	10	12
miles	0	60	160	280	420	520	600

travelled after the number of hours driving shown. The total trip was 12 hours.

(a) What was the average speed in the two hours starting at time 6 ?

 mph

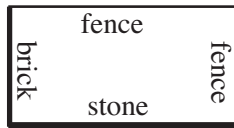
(b) During which time period was the average speed greatest ?

 from to

(c) What was the average speed during the last half of the trip ?

 mph

(10) [/6] A rectangular field has 2 sides made of fence as shown which costs \$ 20 per meter length, one side of brick which costs \$ 70 per meter length and the last side of stone which costs \$40 per meter length.



(a) Express the cost of all the materials used in terms of the lengths of the brick wall and of the stone wall.

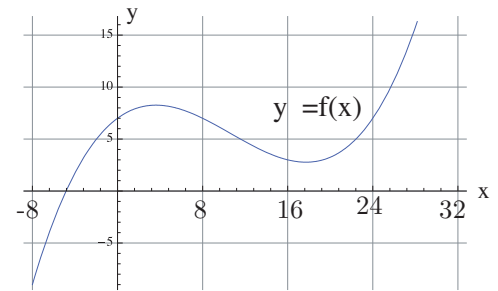
(b) If the area is to be 2000 square meters express the total cost in terms of the length of the brick wall only.

(c) What length should the brick wall be to give the lowest cost with an area of 2000 square meters ?

(a) Approximately what will the population of Ermiland be in 2010 ?

(b) Approximately what will the population of Ermiland be t years after 2000 ?

(7) [/6]



(a) For which values of x is the graph concave up ?

(b) For which values of x is the df/dx negative ?

(c) For which values of x is $f'(x) = 0$?

(11) [/6] If an airline sells tickets for \$200 each then it sells 2000 tickets. For every \$1 the fare is increased, 60 fewer tickets are sold. If the tickets are sold for \$ x each:

(a) How many tickets are sold ? [answer involves x]

(b) How much money in total does the airline receive [answer involves x]?

(c) What should the ticket price be so the airline receives the most money ?

(12) [/6] The number of people in the country Ermiland t years after the year 2000 is $p(t)$. If $p'(t) = 6$ million people per year and $p(0) = 250$ million

(c) In what year (eg 2017) do you think the population of Ermiland will be 370 million