

Name: _____ PID: _____

Circle your section: A01 (11am-12pm) or A02 (12pm-1pm)

MATH 10B: MIDTERM EXAM 1

July 12th, 2012

Do not turn the page until instructed to begin.

Turn off and put away your cell phone.

No calculators or any other devices are allowed.

You may use one 8.5×11 page of handwritten notes, but no other assistance.

Read each question carefully, answer each question completely, & show all of your work.

Write your solutions clearly and legibly; no credit will be given for illegible solutions.

If any question is not clear, ask for clarification.

Good luck!

Solutions

#	Points	Score
1	12	
2	10	
3	9	
4	12	
5	7	
Σ	50	

1. Take the following indefinite integrals.

(a) (4 points) $\int (\sin(x) + 6x^5) dx.$

$$-\cos x + x^6 + C$$

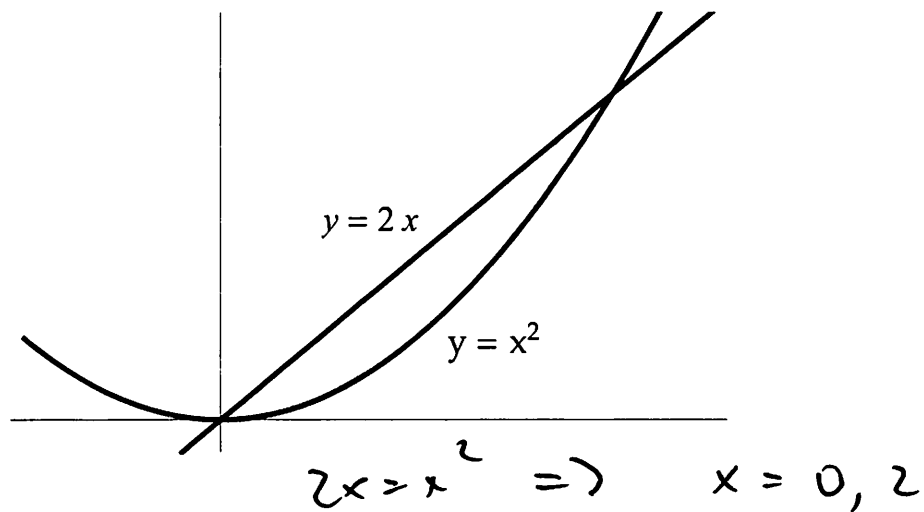
(b) (4 points) $\int \frac{1}{\sqrt{x}} dx.$

$$2x^{1/2} + C$$

(c) (4 points) $\int \frac{4 - xe^x}{x} dx.$

$$4 \ln|x| - e^x + C$$

2. (10 points) Find the area between the curves $y = 2x$ and $y = x^2$, depicted below.



$$\begin{aligned} \text{Area} &= \int_0^2 2x - x^2 = \left. x^2 - \frac{x^3}{3} \right|_0^2 \\ &= \left[4 - \frac{8}{3} \right] \end{aligned}$$

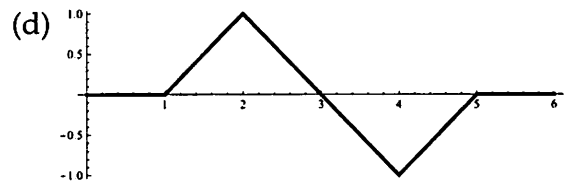
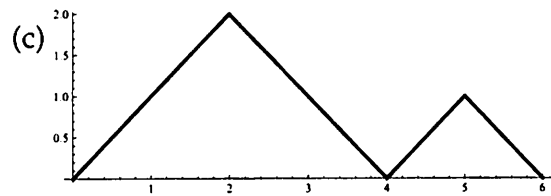
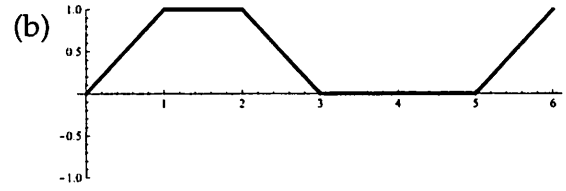
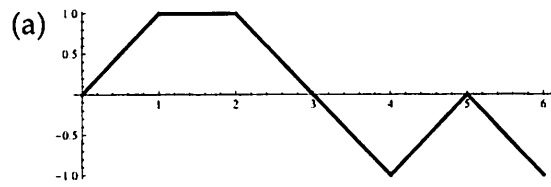
3. (9 points) A hypothetical bullet train takes off from Bakersfield towards Fresno and its acceleration is measured at regular 2 second intervals for the first 10 seconds (shown in the table below). Estimate the minimum velocity it has attained in the first 10 seconds by using a right-hand sum with 5 intervals.

time (seconds)	0	2	4	6	8	10
acceleration (ft/s ²)	40	40	30	20	5	0

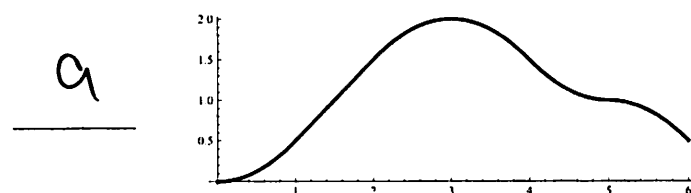
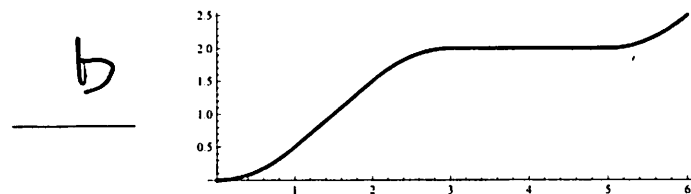
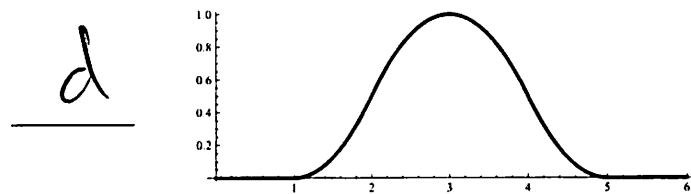
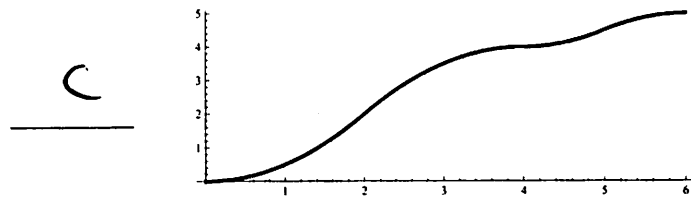
skip.
no approximations
or final

4. (3 points each) Match each function with its antiderivative.

Functions:



Antiderivatives:



5. (7 points) Given the initial condition $y(0) = 3$, solve the differential equation

$$\frac{dy}{dx} = 2e^x + \sin(x).$$

$$y = \int 2e^x + \sin x \, dx$$

$$y = 2e^x - \cos x + C$$

$$\begin{aligned} 3 = y(0) &= 2e^0 - \cos(0) + C \\ &= 1 + C \end{aligned}$$

$$C = 2$$

$$y(x) = 2e^x - \cos x + 2$$