

MAT 1332, Spring/Summer 2012 Assignment 1  
**Due May 17, 2012 at the beginning of class.**  
Late assignments will **not** be accepted; **nor** will unstapled assignments.

Instructor Olga Vasilyeva

Student Name \_\_\_\_\_ Student Number \_\_\_\_\_

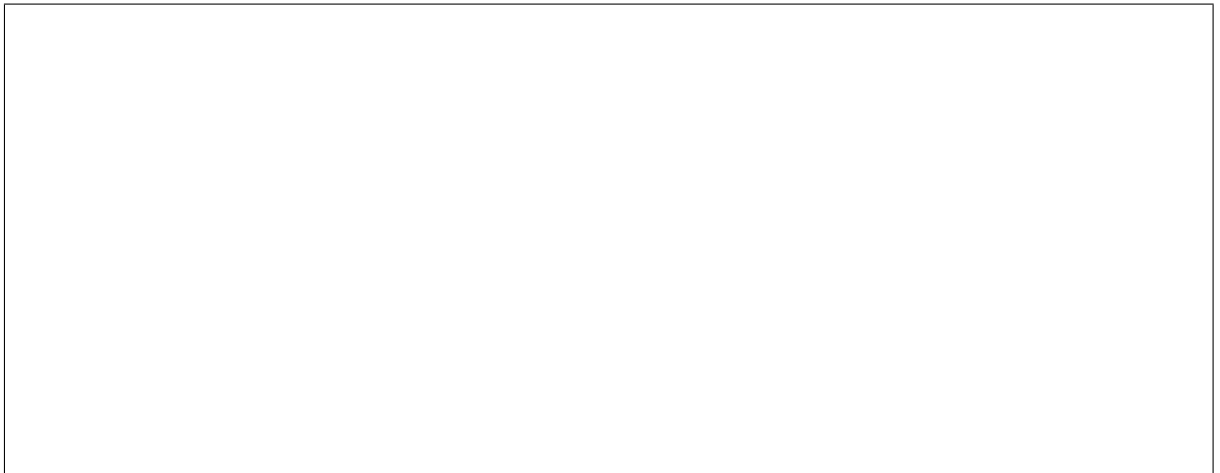
QUESTION 1. Calculate

(a)  $\int \frac{1}{7t-2} dt$

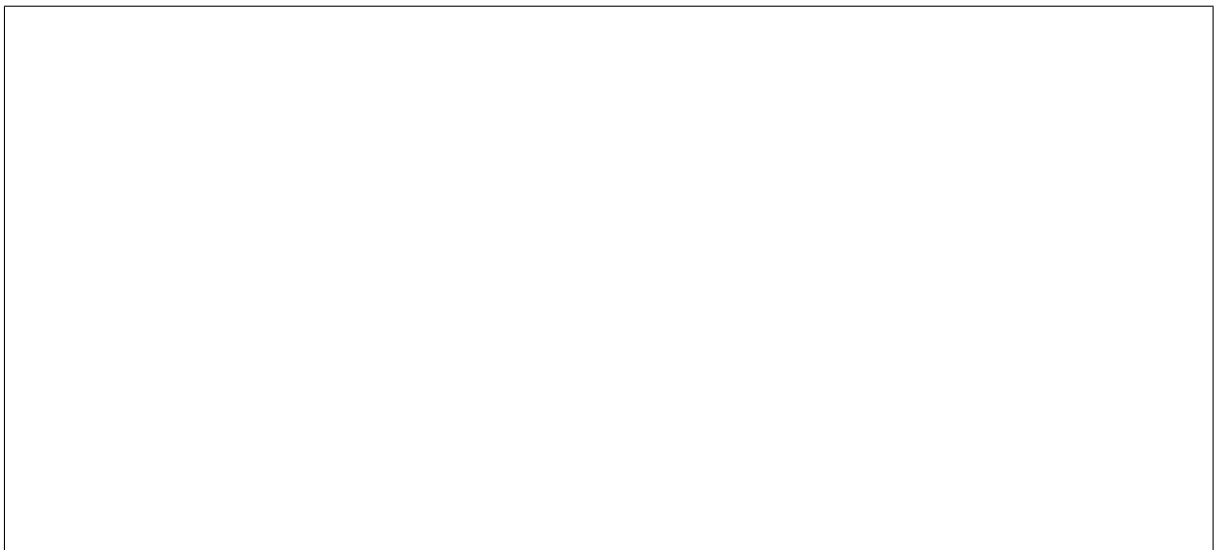
(b)  $\int \frac{1}{3-5t} dt$

(c)  $\int_2^3 (3y^4 - y^5) dy$

(d)  $\int 6 \sin(30x + 40) dx$



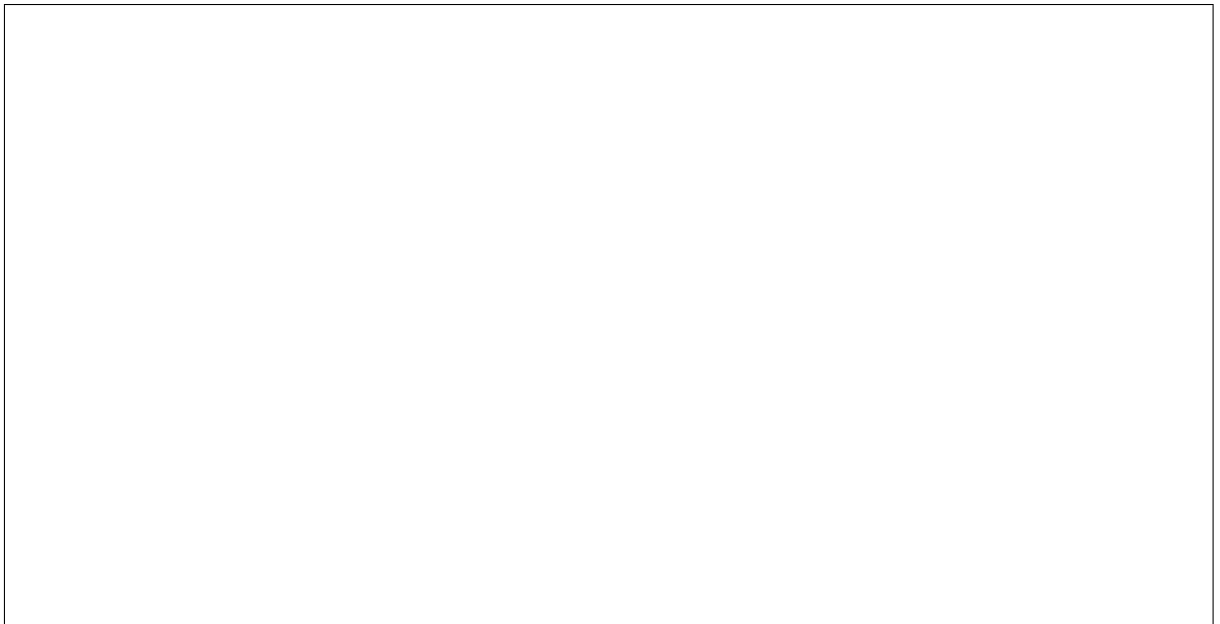
(e)  $\int_0^{\pi/6} x \cos(x) dx$



$$(f) \int_1^2 x^4 \ln(x) dx$$

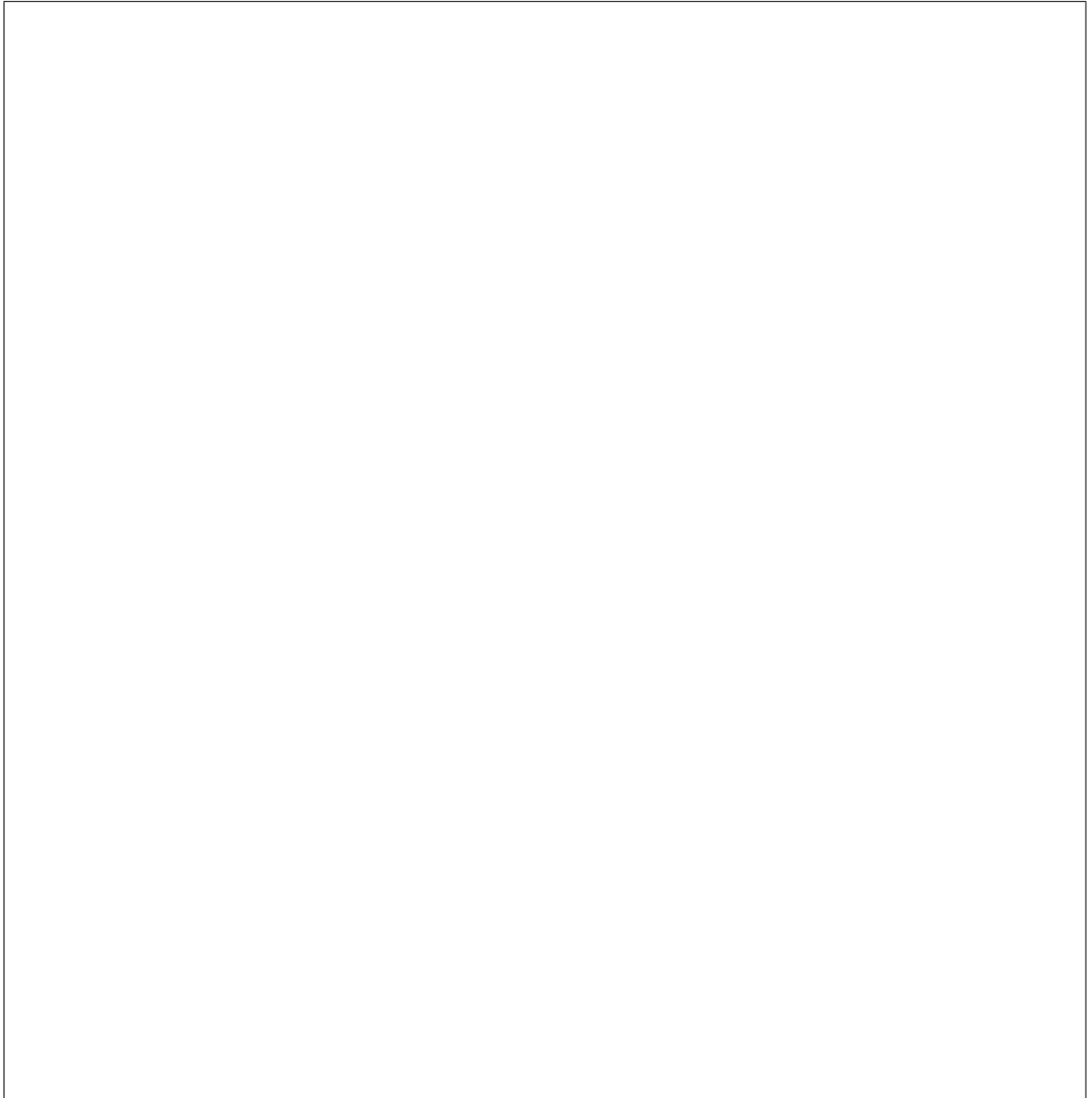


$$(g) \int \frac{e^{2x}}{\cos^2(e^{2x})} dx$$



QUESTION 2. Find the area of the region between the graphs of functions

$$f(x) = \sqrt{x} \text{ and } g(x) = x^3.$$



QUESTION 3. Consider the function  $f(x) = x$  on  $[0, 10]$ . Partition the interval  $[0, 10]$  into five equal subintervals and evaluate

(a) the right-hand Riemann sum,  $I_R$  (using the right endpoints);

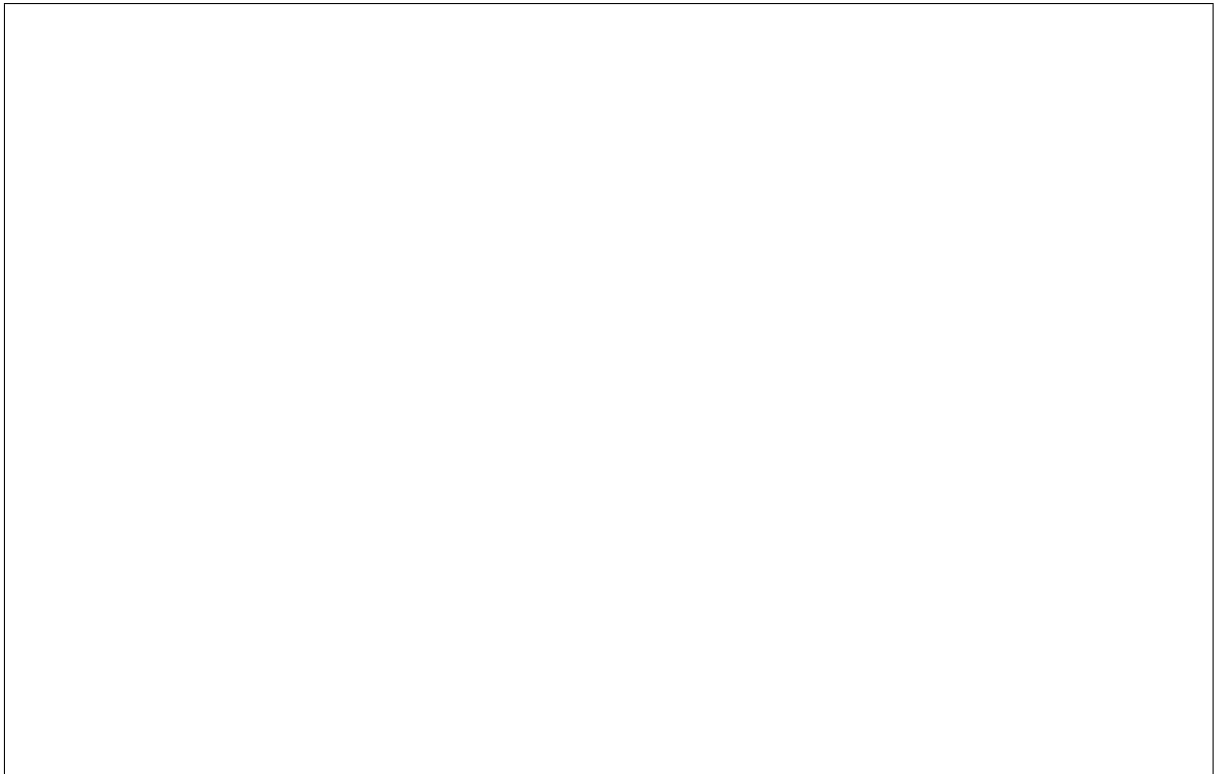
(b) the left-hand Riemann sum,  $I_L$  (using the left endpoints);

(c)  $\int_0^{10} x dx$ ;

(d) Compare your answers in (a), (b) and (c). Which Riemann sum underestimates the actual value of  $\int_0^{10} x dx$ , and which Riemann sum overestimates it? Why? (short 1-2 sentence explanation is enough)



QUESTION 4. The region bounded by the curve  $y = e^{-2x}$  and the  $x$ -axis between  $x = 0$  and  $x = 1$  is revolved around the  $x$ -axis. Find the volume of this solid of revolution.



QUESTION 5. Suppose a flower grows in height according to the equation

$$\frac{dH}{dt} = 5e^{-0.2t},$$

$$H(0) = 6,$$

where  $H(t)$  is the height of the flower (in cm) at time  $t$  (weeks).

(a) How much does the flower grow in the first 4 weeks (between  $t = 0$  and  $t = 4$ )?

(b) Is the growth in the long term (until  $t = \infty$ ) finite or infinite?

(c) Will the total height of the flower ever reach 35cm?