

Mathematics 122 Test #3

Name: _____

You are to use your own calculator, no sharing.**Show your work to get credit.** This means that if you use your calculator to solve a problem, then you have to write a sentence telling how you used it to do the calculations. (That is if you graphed it and zoomed in then say that is what you did etc.)

1. (20 points) Compute the following (you should use your calculator)

(a) $\int_1^3 7(.9)^s ds$

(b) $\int_{-2}^2 (x^3 - 2x) dx$

(c) $\int_0^3 \frac{1}{4+x^2} dx$

- (d) The average value of
- $f(x) = \frac{1-x}{1+x^2}$
- on the interval
- $0 \leq x \leq 5$

2. (15 points) Let $C(t)$ be the cost/day to heat a house, starting at $t = 0$ on January 1, 1995. Assume that $C(t)$ is given by

$$C(t) = \begin{cases} 2.5, & 0 \leq t < 60 \\ 2.0, & 60 \leq t \leq 75 \\ 1.0 & 75 < t \leq 120. \end{cases}$$

- (a) What are the units on $\int_0^{120} C(t) dt$?

Units are: _____

- (b) What is the interpretation of $\int_0^{120} C(t) dt$?

- (c) What is the value of $\int_0^{120} C(t) dt$?

$$\int_0^{120} C(t) dt = \underline{\hspace{10em}}$$

- (d) What is the average value of $C(t)$ on the interval $0 \leq t \leq 60$?

$$\text{Average} = \underline{\hspace{10em}}$$

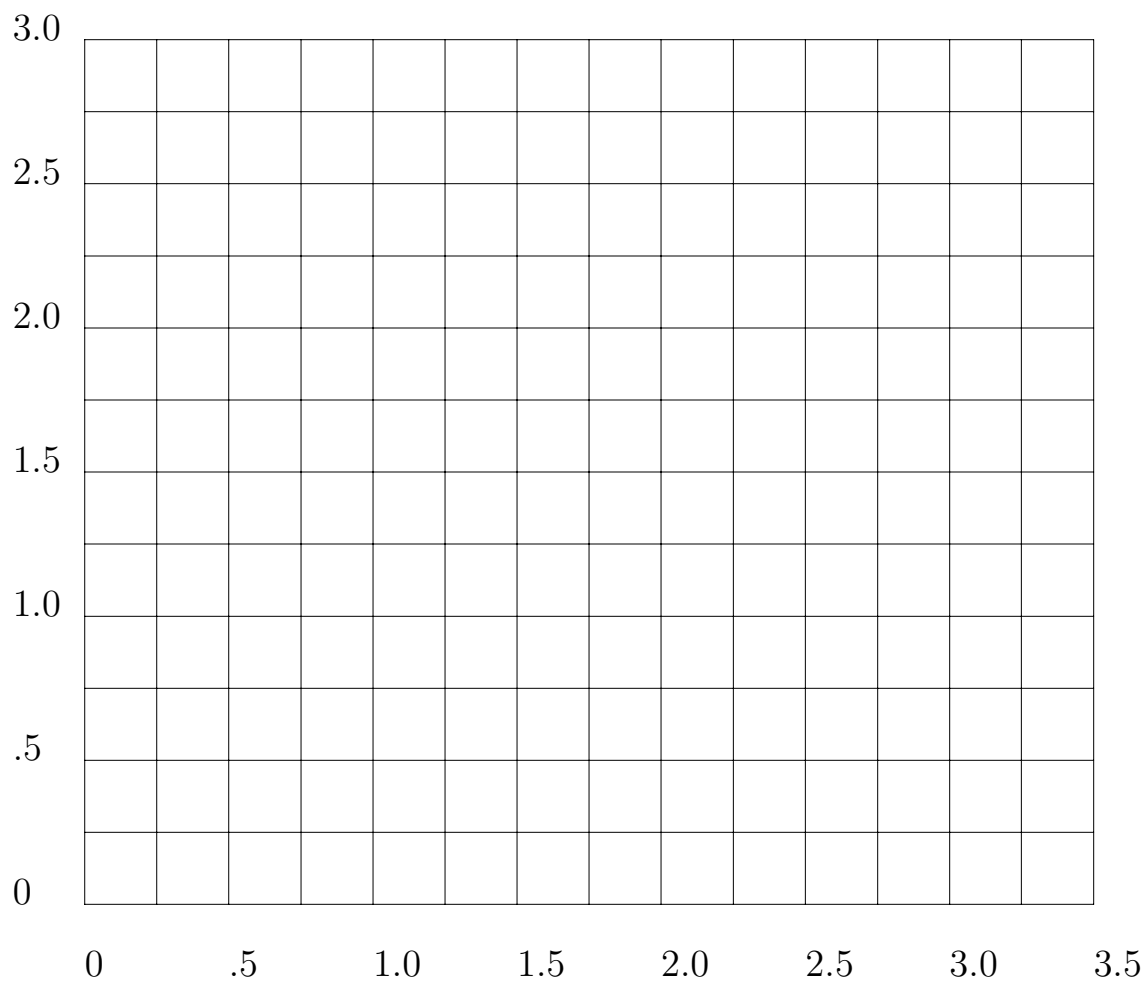
3. (10 points)

(a) Let f be a function defined on the interval $[a, b]$. Then what is the Riemannian sum for f obtained by dividing $[a, b]$ into n equal parts?

(b) Let $f(x) = \frac{x}{x+1}$. Then on the interval $[2, 4]$ compute a Riemannian sum for $f(x)$ which comes from dividing the interval into 4 equal pieces.

4. (10 points)

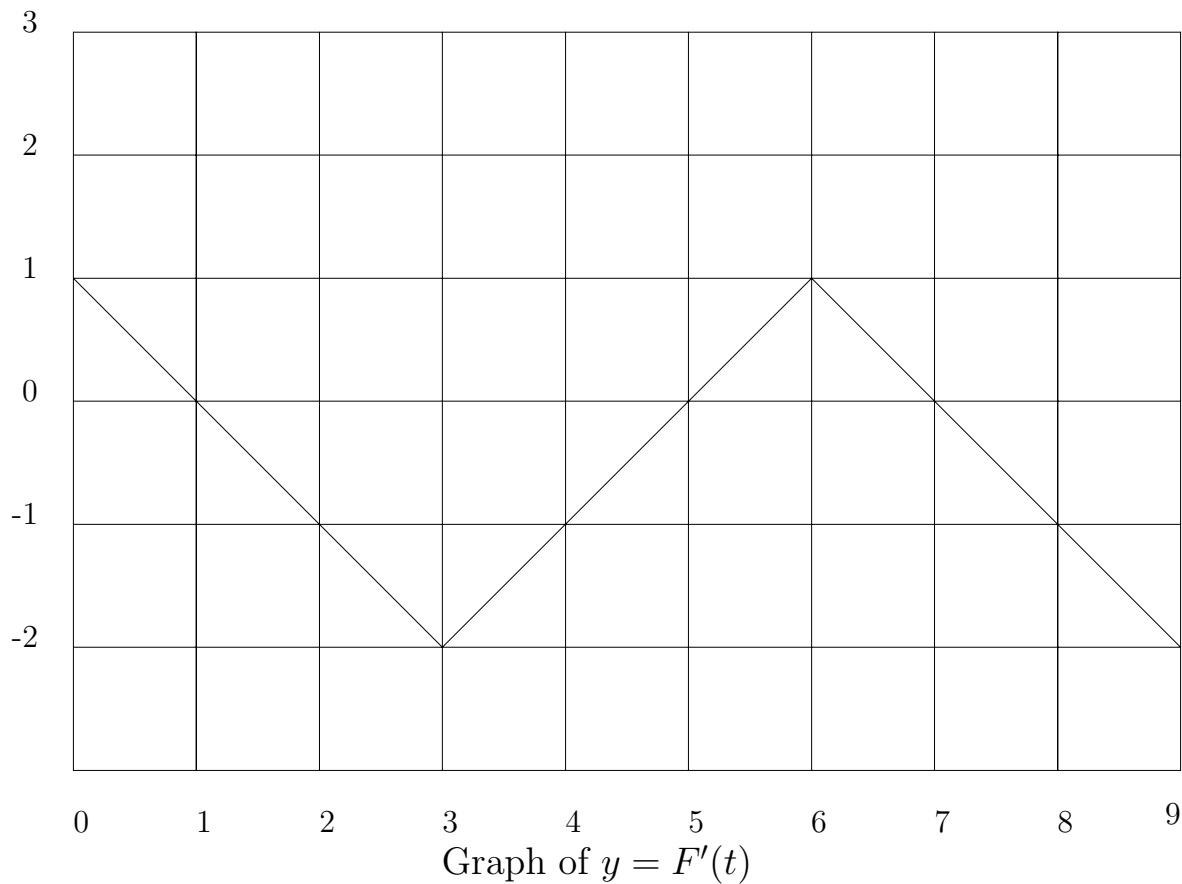
(a) Graph the function $y = 3 - \frac{1}{2}(x - 2)^2$.



(b) Use your graph to estimate the area above the x -axis, below the graph and between $x = 1$ and $x = 3$.

Area \approx _____

5. (20 points) The graph below is of the derivative of a function:



If we know that $F(0) = 2$ compute the following

(a) $\int_0^9 F'(t) dt$

$\int_0^9 F'(t) dt =$ _____

(b) $F(3)$

$F(3) =$ _____

(c) $F(9)$

$F(9) =$ _____

(d) The minimum value of $F(t)$.

Min. = _____

(e) The point where the minimum occurs.

Min. at $t =$ _____

6. (15 points) A baby whale is 750lbs at birth and the The rate of growth of a baby whale is given by $r(t) = 100(.8)^t$ lbs/week with t the time in weeks after its birth.

(a) What is the weight of the whale after 5 weeks?

Weight= _____

(b) What is the weight change in the whale between the eighth week and the tenth week?

Change= _____

(c) Make an estimate at the adult weight of the whale and give a couple of sentences explaining why you think your estimate is correct.

Estimate= _____

7. (5 points) A function $f(t)$ has values given by the table:

t	.5	1.0	1.5	2.0	2.5
$f(t)$	-1.25	-2.0	-2.25	-2.0	-1.25

Estimate $\int_{.5}^{2.5} f(t) dt$.

$$\int_{.5}^{2.5} f(t) dt \approx \underline{\hspace{10em}}$$

8. (5 points) Five free points.

Have a Nice Holiday.