Math 152

Show Your Work! January 26, 2009 Name _____

Good Luck! TEST #1 A (please print)

1. Carefully and completely state **Part I** of the Fundamental Theorem of Calculus.

(4) If

then

2. Use the graph in Fig. 1 to evaluate the following integrals. (2 points each)

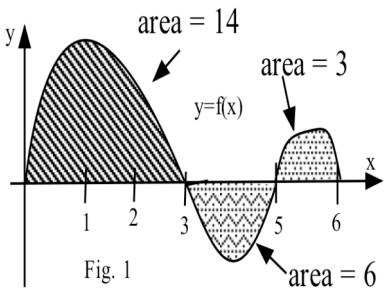


Fig. 1

(16) $\int_3^5 f(x)\,dx$ = _____ $\int_3^6 |f(x)|\,dx$ = _____

$\int_0^5 2 + f(x)\,dx$ = _____ $\int_6^5 2f(x)\,dx$ = _____

$\int_0^3 6x - f(x)\,dx$ = _____ Average value of f(x) on [0,6] is _____

In Fig. 1 x is time (minutes) and y=f(x) is the upward velocity (feet/minute) of a balloon released from the ground.

(a) When is the balloon highest? t = 0 1 2 3 4 5 6 (circle one)

(b) At time x = 2 minutes the balloon was: (rising) (descending) (not enough information) (circle one)

3. The table shows the velocity of a truck when the stop light turns green.

t (sec)	0	1	2	3	4	5	6
vel (ft/sec)	0	20	40	50	60	70	80

(a) Use N = 6 and RIGHT endpoints to approximate the distance the truck traveled during the first 6 seconds. (Show your work.)

(4) Approximate travel distance = _____

(1) (b) Was the truck accelerating faster during the first second or during the last second? FIRST LAST SAME

4. (a) $\frac{d}{dx}\left(\int \sin(x^3)\ dx\right) =$ _____

(8) (b) $\int \left(\frac{d}{dx}\left(\sin(x^3)\right)\right) dx =$ _____

(c) $\frac{d}{dx}\left(\int_1^{x^2} \sqrt{2+t^3}\ dt\right) =$ _____

(d) Use your calculator to evaluate $\int_1^3 \sqrt{2+t^3}\ dt =$ _____ (round to 3 decimal places)

5. DEFINE $\int_1^4 f(x)\ dx = \lim_{\rightarrow}$

(3)

6. Do the following integrals. Give numerical answers to 2 decimal places. Show your work. (**No work = no points. Using fnINT() = no points.)**

(a) $\int x^2 \cdot \cos(x^3+5)\ dx =$ _____

(5)

(b) $\int_0^1 \frac{\cos(x)}{3+\sin(x)}\ dx =$ _____

(5)

(c) $\int \sqrt{6x+7}\ dx =$ _____

(5)

(d) $\int_{1}^{3.6} x + INT(x)\ dx$ = _____

(6)

(e) $\int \sin^2(x)\ dx$ = _____

(4)

(f) $\int \frac{x^2 + 6x + 13}{x + 5}\ dx$ = _____

(5)

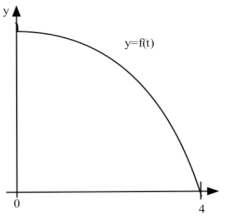
7. Calculate the Area between $f(x) = x^2$ *and* $g(x) = 4$ for $0 \le x \le 3$. Area = _____
(Show your work.)

(6)

8. Quickies: $\int e^{3x} dx$ = _____ $\int \sin(5t)\ dt$ = _____ $\int \sec^2(7x)\ dx$ = _____

(6)

9. $f(t) = 16 - t^2$ is the velocity (feet/second) of a sled as it comes to a stop in 4 seconds.



(3) (a) What was the average velocity of the sled during those 4 seconds? _____

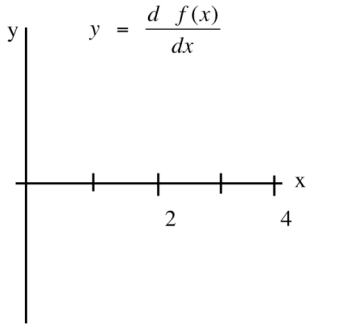
(4) (b) How long did it take the sled to travel the first 15 feet? _____

(round the part (b) answer to one decimal place.)

10. The middle graph below shows y = f(x) where x is hours and y is cats.

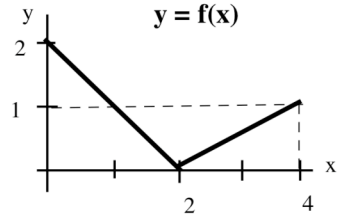
Draw the left graph $y = \frac{d}{dx} f(x)$ and draw the right graph $y = \int_0^x f(t)\ dt$.

Put a **scale (1, 2, 3, …) on each y-axis**, and **give the units for each y variable**.

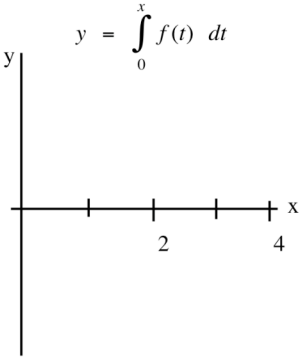


y units: _____

(4)



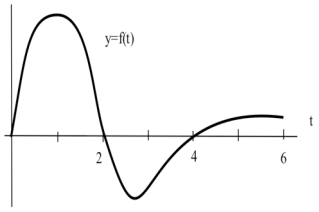
x units: hours
y units: cats



y units: _____

(7)

11. Water is flowing into a tub at the rate (gal/min) shown in the figure.



(2) (a) The tub contains the most water when t = 0 1 2 3 4 5 6

(2) (b) The water is flowing fastest when t = 0 1 2 3 4 5 6

12. Biographies

(2) Name the two people credited with inventing calculus: _____ and _____

THE END !!