

# Math 150 Ch 4 Practice Test.

Integrate:

1)  $\int t^2 (1+2t^3)^{-4/3} dt$

2)  $\int \frac{\sin 7x}{\cos^5 7x} dx$

3)  $\int_0^4 |2x-3| dx$

4)  $\int x^5 (x^3+1)^{7/5} dx$

9) Find the area of 1 arch of a sine wave.

10)  $f(x) = \frac{10}{x^2+1}$   $\approx$  area on  $[-1, 1]$  using 4 rectangles upper and lower sums.

11) Find  $f(x)$  given  $f''(x) = x^2$ ,  $f'(0) = 6$ ,  $f(0) = 3$

12)  $\int_{-3}^3 \sqrt{9-x^2} dx =$

13) If  $f$  is continuous on  $[-4, 4]$  and  $\int_0^4 f(x) dx = 10$ . Find:

a)  $\int_4^0 f(x) dx$     b)  $\int_0^4 [f(x)+3] dx$     c)  $\int_{-2}^2 f(x+2) dx$

d)  $\int_{-4}^4 f(x) dx$  if  $f(x)$  is even    e)  $\int_{-4}^4 f(x) dx$  if  $f(x)$  is odd.

14) Find the average value of  $f(x) = x^2 + x$  on  $[0, 4]$ . Where does the average occur? Show and explain

5) over

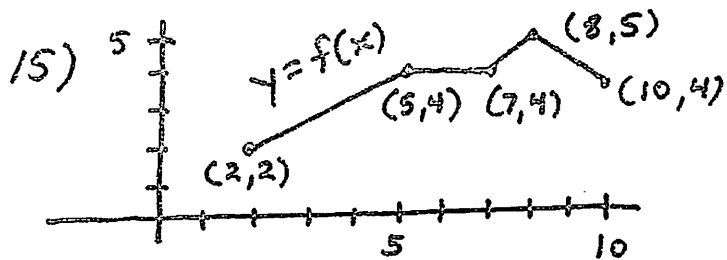
5)  $\int (3 \sin x + 2 \cos 3x - 5 \csc^2 2x) dx$

6)  $F(x) = \int_{3x}^{\sin x} \sqrt{t^2-1} dt$  Find  $F'(x)$

7)  $\int_0^4 \frac{5x^3 - 3x + 4\sqrt{x}}{2x} dx$

8)  $f(x) = \begin{cases} 3x^2 - 2 & \text{if } -1 \leq x < 2 \\ 5x + 7 & \text{if } 2 \leq x < 5 \\ 6 & \text{if } 5 \leq x < 8 \end{cases}$

Find  $\int_0^6 \int_{-1}^7 f(x) dx$



a)  $\int_2^{10} f(x) dx =$

b) Find average value of  $f(x)$  on  $[2, 10]$

c)  $\approx$  where the average occurs

16)  $\sum_{k=3}^{99} (5k-3) =$

show work/not just calculator

17) Particle problem

Answers:

1)  $\frac{-1}{2(1+2t^3)^{1/3}} + c$

2)  $\frac{1}{28 \cos^4 7x} + c$

3) 8.5

4)  $\frac{1}{3} \left[ \frac{5}{17} (x^3+1)^{17/5} - \frac{5}{12} (x^3+1)^{12/5} \right] + c$

5)  $-3 \cos x + \frac{2}{3} \sin 3x + \frac{5}{2} \cot 2x + c$

6)  $\cos x \sqrt{\sin^2 x - 1} - 3 \sqrt{9x^2 - 1}$

7)  $55 \frac{1}{3}$

8) 88.5

9) 2

10) Lower = 13  
Upper = 18

11)  $f(x) = \frac{1}{12} x^4 + 6x + 3$

12)  $9\pi/2$

13) -10, 22, 10, 20

14)  $f(c) = \frac{22}{3}$   
 $c \approx 2.25$

15) 30.5,  $\frac{61}{16}$ ,  $\approx 4.7$

16) 24, 444