Integrals Review

Name: _____

Find the indefinite integral and check the results by differentiation

1) $\int \left(\sqrt{x} + \frac{1}{2\sqrt{x}}\right) dx$

2) $\int (1 - \csc(t)\cot(t))\, dt$

Use left and right endpoints and the given number of rectangles to find two approx. for area.

3) $f(x) = x^2+1$ $[1, 3]$, 8 rectangles

Evaluate the sum

4) $\sum_{i=1}^{n} (i^2-1)$

Evaluate the definite integral by the limit definition.

5) $\int_{-2}^{1} (2x^2+3)\,dx$

Write the limit as a definite integral

6)

$$\lim_{\|\Delta\| \to 0} \sum_{i=1}^{n} \sqrt{C_i^{\,2}+4}\;\Delta x_i \quad [0,3]$$

Evaluate the definite Integral.

7) $\int_{-1}^{1} (t^2-2)\,dt$

8) $\int_{-8}^{-1} \frac{x-x^2}{2\sqrt[3]{x}}\,dx$

9) $\int_{-\pi/6}^{\pi/6} \sec^2 x\,dx$

10) $\int_{0}^{\pi/4} \frac{\sec^2\theta}{\tan^2\theta+1}\,d\theta$

find the value(s) of c guaranteed by the Mean Value theorem for Integrals.

11) $f(x) = x - 2\sqrt{x}, [0,2]$

find the average value of the function over the given interval, and all values x for which the function equals its average value.

12) $f(x) = 9 - x^2, [-3,3]$

Find F as a function of x and evaluate it at $x = 2$, $x = 5$, and $x = 8$

13) $F(x) = \int_0^x (4t - 7)\,dt$

Use the second fondamental theorem of calculus.

14.) $F(x) = \int_1^x \sqrt[4]{t}\, dt$

Find $F'(x)$

15) $F(x) = \int_{-x}^{x} t^3\, dt$

Integrate by Substitution

16) $\int (1+2x)^4 (2)\, dx$

17) $\int \frac{t+2t^2}{\sqrt{t}}\,dt$

18) $\int \frac{x}{\sqrt{2x-1}}\,dx$

19) $\int_{-2}^{0} (3^3-5^2)\,dx$

20) $\int \sqrt{\tan x}\cdot \sec^2 x\,dx$