

Review integration

Date _____ Period _____

Evaluate each sum.

1) $\sum_{k=1}^n (8k + 4)$

2) $\sum_{k=1}^n (16k + 16)$

Evaluate each limit.

3) $\lim_{n \rightarrow \infty} \sum_{k=1}^n \left(\frac{6}{n} + \frac{27k}{n^2} \right)$

4) $\lim_{n \rightarrow \infty} \sum_{k=1}^n \left(\frac{1}{n} + \frac{2k}{n^2} \right)$

For each problem, find the area under the curve over the given interval. Set up your solution using the limit as n goes to ∞ of the upper sum. Also, find the approximate area using 4 rectangles with the upper sum

5) $f(x) = 2x^2 + 4; [1, 2]$

6) $f(x) = x^2 + 6; [1, 2]$

For each problem, find the area under the curve over the given interval. Set up your solution using the limit as n goes to ∞ of the lower sum. Also, find the approximate area using 4 rectangles with the lower sum

7) $f(x) = 2x^2 + 5; [0, 2]$

8) $f(x) = 2x^2 + 2; [0, 1]$

Express each definite integral in terms of u , but do not evaluate.

9) $\int_{-2}^1 \frac{12x}{(2x^2 + 1)^2} dx; u = 2x^2 + 1$

10) $\int_{-1}^0 \frac{4x}{(x^2 + 2)^2} dx; u = x^2 + 2$

11) $\int_1^2 \frac{8x}{(2x^2 + 2)^2} dx; u = 2x^2 + 2$

Evaluate each definite integral.

12) $\int_1^3 -\frac{6x}{(x^2 + 3)^2} dx; u = x^2 + 3$

13) $\int_0^1 \frac{8x}{(4x^2 + 2)^2} dx; u = 4x^2 + 2$

Evaluate each indefinite integral.

14) $\int 12x^2 \sqrt{4x^3 + 5} dx$

15) $\int -3\sec^2 x - 3x \sqrt[3]{\tan x} dx$

16) $\int -\frac{5\sec x - 5x \tan x}{\sec^5 x} dx$

17) $\int 2\csc x - 2x \cot x - 2x \sqrt{\csc x} dx$

18) $\int \frac{4e^{4x}}{(e^{4x} - 1)^3} dx$

19) $\int \frac{(-1 + \ln x)^5}{x} dx$

For each problem, find $F'(x)$.

20) $F(x) = \int_{-3}^x (t + 2) dt$

21) $F(x) = \int_3^{3x} \frac{5}{(t - 1)^3} dt$

$$22) F(x) = \int_0^{3x} (t^3 - t^2 - 1) dt$$

$$23) F(x) = \int_x^{x^2} (t^3 - t^2 + 1) dt$$

$$24) F(x) = \int_x^{2x} (t^3 - 3t^2 - 3) dt$$

For each problem, find the average value of the function over the given interval.

$$25) f(x) = -x^3 + 2x^2 - 2; [0, 1]$$

For each problem, find the average value of the function over the given interval. Then, find the values of c that satisfy the Mean Value Theorem for Integrals.

$$26) f(x) = -2x^2 + 12x - 13; [4, 5]$$

For each problem, find the values of c that satisfy the Mean Value Theorem for Integrals.

$$27) f(x) = 3(x - 1)^{\frac{1}{2}}; [1, 4]$$

$$28) f(x) = -\frac{5}{(x - 2)^2}; [4, 6]$$

For each problem, find the average value of the function over the given interval.

$$29) f(x) = -\frac{1}{2x - 2}; [3, 4]$$

$$30) f(x) = -\frac{4}{2x + 2}; [1, 3]$$

- 31) Let the velocity of a particle traveling along the x-axis be given by $v(t)=t^2-2t+7$. Find the displacement and distance traveled by the particle from $t=2$ to $t=5$ seconds.