10.3 u Substitution Definite Integrals

NOTES

CALCULUS

Write your questions here!

DEFINITE INTEGRAL

$$\int_0^1 t^2(t^3+1)^2 dt$$

CHANGE OF BOUNDARIES

Evaluate the definite integrals using *u* substitution.

$$\int_0^{\frac{\pi}{2}} \cos(x)\sqrt{\sin(x)}\, dx$$

Evaluate the definite integrals using *u* substitution.

$$\int_0^e \frac{x}{x^2+4} dx$$

Evaluate the indefinite integrals using *u* substitution. SPECIAL CASE

$$\int \frac{x}{\sqrt{x+1}}\,dx$$

SUMMARY:

Now, summarize your notes here!

10.3 u Substitution Definite Integrals

PRACTICE

Evaluate the definite integral.

1. $\int_1^2 \sqrt{5x-1}\ dx$

2. $\int_0^{\frac{\pi}{2}} \sin(2x)\,dx$

Evaluate the definite integral.

3. $\int_0^1 e^x(4-e^x)dx$

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

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5. $\int_{-2}^{3} \frac{1}{1+9t^2}dt$

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6. $\int_0^1 x\sqrt{1-x^2}\ dx$

Evaluate the definite integral.

7. $\int_3^6 \left(\frac{x^2-2x}{x}\right) dx$

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8. $\int_{-\frac{\pi}{4}}^{0} \tan x \sec^2 x \, dx$

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9. $\int_0^{\frac{\pi}{8}} \sec(2x) \tan(2x) \, dx$

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10. $\int_1^e \frac{\ln x}{x} dx$

Evaluate the definite integral.

11. $\int_{3}^{\sqrt{30}} \frac{2x}{\sqrt{x^2-5}}dx$

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12. $\int_{0}^{1} \frac{x^2+2x}{\sqrt[3]{x^3+3x^2+4}}dx$

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13. $\int_{0}^{\pi} (2\sin x + \sin 2x)dx$

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14. $\int_{0}^{4} \frac{x}{\sqrt{2x+1}}dx$

MULTIPLE CHOICE

1. Evaluate $\int_{-1}^{2}(3x^2 - 4x + 2)dx$.

(A) -2

(B) 14

(C) 9

(D) 18

(E) 21

2. An equivalent representation of the definite integral $\int_{1}^{3} 2x\cos(x^2)dx$ is

(A) $\int_{1}^{3}\cos u\ du$

(B) $\int_{1}^{9}\cos u\ du$

(C) $\int_{1}^{\sqrt{3}}\cos u\ du$

(D) $\int_{1}^{9} 2\sqrt{u}\cos u\ du$

(E) $\int_{1}^{\sqrt{3}} 2\sqrt{u}\cos u\ du$

FREE RESPONSE

Your score:_____ out of 9 points

1. The function f is defined by $f(x) = \sqrt{25 - x^2}$ for $-5 \le x \le 5$.

(a) Find $f'(x)$.

(b) Write an equation for the line tangent to the graph of f at $x = -3$.

(c) Let g be the function defined by $g(x) = \begin{cases} f(x) & \text{for } -5 \le x \le -3 \\ x + 7 & \text{for } -3 < x \le 5 \end{cases}$

Is g continuous at $= -3$? Use the definition of continuity to explain your answer.

(d) Find the value of $\int_{0}^{5} x\sqrt{25 - x^2}\,dx$.