31 Lecture - MTH101

Important Mcqs

What is the correct substitution for evaluating the definite integral of $\cos(x)\sin(x) dx$ from 0 to 2/2?

a) $u = \cos(x)$

b) u = sin(x)

c) $u = \cos(x)\sin(x)$

d) $u = ?(1 - \cos^2(x))$

Answer: b) u = sin(x)

Explanation: Using the substitution u = sin(x), we get du/dx = cos(x) dx. Substituting this into the integral and using the limits of integration, we get cos(x)sin(x) dx from 0 to 2/2 is equal to 2u du from 0 to 1, which evaluates to 1/2.

What is the correct substitution for evaluating the definite integral of ?x^2sqrt(x+1) dx from 0 to 1?

a) u = x + 1

b) u = x^2

c) u = sqrt(x+1)

d) u = x + 1/2

Answer: a) u = x+1

Explanation: Using the substitution u = x+1, we get du/dx = 1 dx. Substituting this into the integral and using the limits of integration, we get $2x^2 \operatorname{sqrt}(x+1) dx$ from 0 to 1 is equal to $2(u-1)^2 \operatorname{sqrt}(u) du$ from 1 to 2, which can be evaluated using integration by parts.

What is the correct substitution for evaluating the definite integral of ?sec(x)tan(x) dx from 0 to ?/4?

a) u = sec(x)
b) u = tan(x)
c) u = sec(x)tan(x)
d) u = sin(x)/cos(x)

Answer: a) u = sec(x)

Explanation: Using the substitution $u = \sec(x)$, we get $du/dx = \sec(x)\tan(x) dx$. Substituting this into the integral and using the limits of integration, we get $2\sec(x)\tan(x) dx$ from 0 to 2π is equal to 2 u du from 2 to 1, which evaluates to $\ln(22 + 1)$.

What is the correct substitution for evaluating the definite integral of $x^3e^{(x^4+1)} dx$ from 0 to 1?

a) $u = x^{4+1}$

- b) $u = e^{(x^4+1)}$
- c) u = x^3
- d) $u = e^x$

Answer: a) u = x^4+1

Explanation: Using the substitution $u = x^4+1$, we get $du/dx = 4x^3 dx$. Substituting this into the integral and using the limits of integration, we get $?x^3e^{(x^4+1)} dx$ from 0 to 1 is equal to $(1/4)?e^u du$ from 1 to 2, which evaluates to $(e^2 - e)/4$.

What is the correct substitution for evaluating the definite integral of $?(x+1)\cos(x^2+2x+1) dx$ from 0 to 1?

a) $u = x^{2}+2x+1$ b) $u = \cos(x^{2}+2x+1)$ c) u = x+1d) $u = \sin(x^{2}+2x+1)$ Answer: a) $u = x^{2}+2x+1$

Explanation: Using the substitution $u = x^2+2x+1$, we