## 31 Lecture - MTH101

## Important Mcqs

What is the correct substitution for evaluating the definite integral of $\boldsymbol{?} \cos (x) \sin (x) d x$ from 0 to $\boldsymbol{?} / \mathbf{2}$ ?
a) $u=\cos (x)$
b) $\mathrm{u}=\sin (\mathrm{x})$
c) $u=\cos (x) \sin (x)$
d) $u=?\left(1-\cos ^{\wedge} 2(x)\right)$

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

What is the correct substitution for evaluating the definite integral of $\mathbf{?} \mathrm{x}^{\wedge} 2 \mathrm{sqrt}(\mathrm{x}+1) \mathrm{dx}$ from 0 to 1 ?
a) $u=x+1$
b) $u=x^{\wedge} 2$
c) $u=\operatorname{sqrt}(x+1)$
d) $u=x+1 / 2$

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

What is the correct substitution for evaluating the definite integral of $\boldsymbol{?} \sec (x) \tan (x) d x$ from 0 to $\boldsymbol{?} / 4 \boldsymbol{?}$
a) $u=\sec (x)$
b) $\mathrm{u}=\tan (\mathrm{x})$
c) $u=\sec (x) \tan (x)$
d) $\mathrm{u}=\sin (\mathrm{x}) / \cos (\mathrm{x})$

Answer: a$) \mathrm{u}=\sec (\mathrm{x})$

Explanation: Using the substitution $u=\sec (x)$, we get $d u / d x=\sec (x) \tan (x) d x$. Substituting this into the integral and using the limits of integration, we get ? $\sec (x) \tan (x) d x$ from 0 to ?/4 is equal to ?u du from ? 2 to 1 , which evaluates to $\ln (? 2+1)$.

What is the correct substitution for evaluating the definite integral of $\mathbf{?} x^{\wedge} \mathbf{3} \mathrm{e}^{\wedge}\left(x^{\wedge} 4+1\right) d x$ from 0 to 1 ?
a) $u=x^{\wedge} 4+1$
b) $u=e^{\wedge}\left(x^{\wedge} 4+1\right)$
c) $u=x^{\wedge} 3$
d) $u=e^{\wedge} x$

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

What is the correct substitution for evaluating the definite integral of $\mathbf{?}(\mathrm{x}+1) \cos \left(\mathrm{x}^{\wedge} 2+2 \mathrm{x}+1\right)$ dx from 0 to 1 ?
a) $u=x^{\wedge} 2+2 x+1$
b) $u=\cos \left(x^{\wedge} 2+2 x+1\right)$
c) $u=x+1$
d) $u=\sin \left(x^{\wedge} 2+2 x+1\right)$

Answer: a) $u=x^{\wedge} 2+2 x+1$
Explanation: Using the substitution $u=x^{\wedge} 2+2 x+1$, we

