## 16 Lecture - MTH101

## Important Mcqs

What is the derivative of $f(x)=x^{\wedge} 3+4 x^{\wedge} 2-5 x-2$ ?
a) $f^{\prime}(x)=3 x^{\wedge} 2+8 x-5$
b) $f^{\prime}(x)=3 x^{\wedge} 2+8 x+5$
c) $f^{\prime}(x)=3 x^{\wedge} 3+8 x^{\wedge} 2-5 x-2$
d) $f^{\prime}(x)=3 x^{\wedge} 2+4 x-5$

Solution: The derivative of $f(x)$ is $f^{\prime}(x)=3 x^{\wedge} 2+8 x-5$. Therefore, the correct answer is an option (a).

What is the derivative of $f(x)=\sin (x) \cos (x)$ ?
a) $f^{\prime}(x)=\cos (x) \sin (x)$
b) $f^{\prime}(x)=\cos ^{\wedge} 2(x)-\sin ^{\wedge} 2(x)$
c) $f^{\prime}(x)=-\sin (x) \cos (x)$
d) $f^{\prime}(x)=2 \cos (x) \sin (x)$

Solution: Using the product rule, we get $\mathrm{f}^{\prime}(\mathrm{x})=\cos (\mathrm{x}) \cos (\mathrm{x})-\sin (\mathrm{x}) \sin (\mathrm{x})=\cos ^{\wedge} 2(\mathrm{x})-\sin ^{\wedge} 2(\mathrm{x})$. Therefore, the correct answer is option (b).

What is the derivative of $f(x)=3 x^{\wedge} 4-2 x^{\wedge} 3+5 x^{\wedge} 2-4 x+1$ ?
a) $f^{\prime}(x)=12 x^{\wedge} 3-6 x^{\wedge} 2+10 x-4$
b) $f^{\prime}(x)=12 x^{\wedge} 3-6 x^{\wedge} 2+5 x-4$
c) $f^{\prime}(x)=3 x^{\wedge} 3-2 x^{\wedge} 2+5 x-4$
d) $f^{\prime}(x)=3 x^{\wedge} 3-2 x^{\wedge} 2+10 x-4$

Solution: The derivative of $f(x)$ is $f^{\prime}(x)=12 x^{\wedge} 3-6 x^{\wedge} 2+10 x-4$. Therefore, the correct answer is option (a).

What is the derivative of $f(x)=e^{\wedge} x \cos (x)$ ?
a) $f^{\prime}(x)=e^{\wedge} x \sin (x)$
b) $f^{\prime}(x)=e^{\wedge} x(\cos (x)+\sin (x))$
c) $f^{\prime}(x)=e^{\wedge} x(\cos (x)-\sin (x))$
d) $f^{\prime}(x)=e^{\wedge} x(\cos (x)-\cos (x))$

Solution: Using the product rule, we get $\mathrm{f}^{\prime}(\mathrm{x})=\mathrm{e}^{\wedge} \mathrm{x} \cos (\mathrm{x})-\mathrm{e}^{\wedge} \mathrm{x} \sin (\mathrm{x})=\mathrm{e}^{\wedge} \mathrm{x}(\cos (\mathrm{x})-\sin (\mathrm{x}))$. Therefore, the correct answer is option (c).

What is the derivative of $f(x)=\ln (5 x)$ ?
a) $f^{\prime}(x)=1 /(5 x)$
b) $\mathrm{f}^{\prime}(\mathrm{x})=5 \ln (\mathrm{x})$
c) $\mathrm{f}^{\prime}(\mathrm{x})=5 /(\ln (\mathrm{x}))$
d) $f^{\prime}(x)=1 / x$

Solution: Using the chain rule, we get $\mathrm{f}^{\prime}(\mathrm{x})=1 /(5 \mathrm{x})$. Therefore, the correct answer is option (a).

What is the derivative of $f(x)=x^{\wedge} \mathbf{2} \ln (x)$ ?
a) $f^{\prime}(x)=2 x \ln (x)+x$
b) $f^{\prime}(x)=x \ln (x)$
c) $f^{\prime}(x)=2 x \ln (x)+2 x$
d) $f^{\prime}(x)=2 x \ln (x)+x^{\wedge} 2$

Solution: Using (a)

