## 15 Lecture - MTH101

## Important Mcqs

What is the derivative of $f(x)=x^{\wedge} 2$ at $x=3$ ?
a) 3
b) 6
c) 9
d) 12

Answer: b) 6 (Using the power rule, $f^{\prime}(x)=2 x$, so $f^{\prime}(3)=2(3)=6$ )

What is the derivative of $f(x)=\cos (x)$ at $x=p i / 4$ ?
a) -1
b) $-\sin (\mathrm{p} / 4)$
c) $\cos (\mathrm{p} / 4)$
d) $-\cos (\mathrm{p} / 4)$

Answer: d) $-\cos (\mathrm{pi} / 4)\left(\right.$ Using the chain rule, $\mathrm{f}^{\prime}(\mathrm{x})=-\sin (\mathrm{x})$, so $\left.\mathrm{f}^{\prime}(\mathrm{pi} / 4)=-\sin (\mathrm{p} / 4)=-\cos (\mathrm{p} / 4)\right)$

What is the derivative of $f(x)=e^{\wedge} x$ at $x=0$ ?
a) 0
b) 1
c) e
d) $e^{\wedge}-1$

Answer: b) 1 (Using the power rule, $f^{\prime}(x)=e^{\wedge} x$, so $f^{\prime}(0)=e^{\wedge} 0=1$ )

What is the derivative of $f(x)=\ln (x)$ at $x=1$ ?
a) 0
b) 1
c) -1
d) undefined

Answer: b) 1 (Using the derivative of $\ln (x), f^{\prime}(x)=1 / x$, so $f^{\prime}(1)=1 / 1=1$ )

What is the derivative of $f(x)=5 x^{\wedge} 4-3 x^{\wedge} 2+2 x-1 ?$
a) $20 x^{\wedge} 3-6 x+2$
b) $20 x^{\wedge} 3-6 x^{\wedge} 2+2$
c) $20 x^{\wedge} 3-6 x+1$
d) $20 x^{\wedge} 4-6 x^{\wedge} 2+2$

Answer: a) $20 x^{\wedge} 3-6 x+2$ (Using the power rule, $f^{\prime}(x)=20 x^{\wedge} 3-6 x^{\wedge} 2+2$ )

What is the derivative of $f(x)=\operatorname{sqrt}(x)$ at $x=4$ ?
a) $1 / 8$
b) $1 / 4$
c) $1 / 2$
d) 2

Answer: b) $1 / 4$ (Using the derivative of $\operatorname{sqrt}(x), f^{\prime}(x)=1 /(2 \operatorname{sqrt}(x))$, so $\left.f^{\prime}(4)=1 /(2 \operatorname{sqrt}(4))=1 / 4\right)$

What is the derivative of $f(x)=\sin (x)+\cos (x)$ at $x=p i / 3$ ?
a) $-1 / 2$
b) 0
c) $1 / 2$
d) $\operatorname{sqrt}(3) / 2$

Answer: c) $1 / 2$ (Using the sum rule and the derivative of $\sin (\mathrm{x})$ and $\cos (\mathrm{x}), \mathrm{f}^{\prime}(\mathrm{x})=\cos (\mathrm{x})-\sin (\mathrm{x})$, so $\mathrm{f}^{\prime}(\mathrm{pi} / 3)=$ $\cos (\mathrm{pi} / 3)-\sin (\mathrm{pi} / 3)=1 / 2-\operatorname{sqrt}(3) / 2=1 / 2-1 / 2 \operatorname{sqrt}(3)=1 / 2(1-1 / \mathrm{sqrt}(3))=1 / 2(1-\operatorname{sqrt}(3) / 3)=1 / 2-\operatorname{sqrt}(3) / 6$ $=1 / 2-0.289=0.211$ )

What is the derivative of $f(x)=1 / x$ at $x=2$ ?
a) $-1 / 4$

