## 6 Lecture - MTH101

## Important Mcqs

1. What is the limit of the function $f(x)=2 x+1$ as $x$ approaches $\mathbf{3}$ ?
a) 5
b) 7
c) 8
d) 9

Answer: b) 7
Solution: When $x$ approaches 3 , the value of $f(x)$ approaches $(2 * 3+1)=7$.
2. Which of the following functions is continuous at $\mathbf{x}=\mathbf{0}$ ?
a) $f(x)=1 / x$
b) $f(x)=x^{\wedge} 2$
c) $f(x)=|x|$
d) $f(x)=\operatorname{sqrt}(x)$

Answer: b) $f(x)=x^{\wedge} 2$
Solution: The function $f(x)=x^{\wedge} 2$ is continuous at $x=0$ because the limit of $f(x)$ as $x$ approaches 0 is equal to $f(0)=0$.
3. What is the derivative of the function $f(x)=x^{\wedge} 3$ ?
a) $3 x^{\wedge} 2$
b) $2 x^{\wedge} 3$
c) $4 x^{\wedge} 3$
d) $x^{\wedge} 2$

Answer: a) $3 x^{\wedge}$ 2
Solution: The derivative of $f(x)=x^{\wedge} 3$ is $f^{\prime}(x)=3 x^{\wedge} 2$.
4. What is the integral of the function $f(x)=1 / x$ ?
a) $\ln (x)+C$
b) $x^{\wedge} 2 / 2+C$
c) $2 x+C$
d) $e^{\wedge} x+C$

Answer: a) $\ln (x)+C$
Solution: The integral of $f(x)=1 / x$ is $F(x)=\ln |x|+C$.
5. What is the domain of the function $f(x)=\operatorname{sqrt}(x-4)$ ?
a) (-infinity, 4]
b) $[4$, infinity)
c) $[0$, infinity)
d) (-infinity, infinity)

Answer: b) [4, infinity)

Solution: The function $f(x)=\operatorname{sqrt}(x-4)$ is defined only for $x>=4$, which gives the domain [4, infinity).
6. What is the limit of the function $f(x)=\sin (x) / x$ as $x$ approaches 0 ?
a) 0
b) 1
c) -1
d) does not exist

Answer: b) 1
Solution: The limit of $f(x)=\sin (x) / x$ as $x$ approaches 0 is 1 , which can be proved using L'Hopital's rule or the squeeze theorem.
7. Which of the following functions is not differentiable at $\mathbf{x}=0$ ?
a) $f(x)=|x|$
b) $f(x)=x^{\wedge} 2$
c) $f(x)=\operatorname{sqrt}(x)$
d) $f(x)=1 / x$

Answer: a) $f(x)=|x|$
Solution: The function $f(x)=|x|$ is not differentiable at $x=0$ because it has a sharp point at that point.
8. What is the integral of the function $f(x)=2 x$ ?
a) $x^{\wedge} 2+C$
b) $x^{\wedge} 2+1$
c) $x^{\wedge} 3+C$
d) $2 x^{\wedge} 2+C$

Answer: a) $\mathbf{x}^{\wedge} \mathbf{2}+\mathrm{C}$
Solution: The integral of $f(x)=2 x$ is $F(x)=x^{\wedge} 2+C$.
9. What is the limit of the function $f(x)=\left(x^{\wedge} 2-4\right) /(x-2)$ as $x$ approaches 2 ?
a) 0
b) 1
c) 2
d) does not exist

Answer: c)

