Started on	Monday, 1 February 2021, 2:06 PM
State	Finished
Completed on	Monday, 1 February 2021, 2:21 PM
Time taken	15 mins 1 sec
Grade	**6.00** out of 10.00 (**60**%)

Question 1

Correct

Mark 2.00 out of 2.00

Let $A, B \in \mathbb{R}^2$ and $A = \{(x, y) : \sqrt{x^2 + y^2} \leq 5\}$ and $B = \{(x, y) : \sqrt{x^2 + y^2} < \sqrt{5}\}$. Then choose the **incorrect** option.

Select one:

a. $A \cap B$ is open in $\mathbb{R}^2$.

b. $A \cap B$ is closed in $\mathbb{R}^2$. ✓

c. $A \cup B$ is closed in $\mathbb{R}^2$.

d. A and B are respectively closed and open in $\mathbb{R}^2$.

Your answer is correct.

The correct answer is: $A \cap B$ is closed in $\mathbb{R}^2$.

Question 2

Incorrect

Mark 0.00 out of 2.00

Consider the function $f(x,y)=\begin{cases}\frac{xy\sin\sqrt{x^2+y^2}}{x^2+y^2}, & \text{for } (x,y)\neq(0,0)\\ 0, & \text{for } x=y.\end{cases}$ Then

Select one:

- a. Both the repeated limits exist and are equal to 1.
- b. $f(x,y)$ is continuous at $(0,0)$.
- c. $\lim\limits_{(x,y)\to(0,0)} f(x,y)$ does not exist. ✘
- d. If instead $f(0,0)$ is chosen to be equal to 1, then $f(x,y)$ becomes continuous at $(0,0)$.

Your answer is incorrect.

The correct answer is: $f(x,y)$ is continuous at $(0,0)$.

Question 3

Correct

Mark 2.00 out of 2.00

Find the value of c for which the function $f(x,y)=\begin{cases}\frac{\sin x}{x(y-9)} & \text{if } x\neq 0,\\ c & \text{otherwise.}\end{cases}$ is continuous at $(0,0)$.

Select one:

- a. 0
- b. $-\frac{1}{9}$ ✓
- c. ∞
- d. none of these

Your answer is correct.

The correct answer is: $-\frac{1}{9}$

Question 4

Correct

Mark 2.00 out of 2.00

Consider the function $f(x,y) = \sin(x^2 \cos y)$. Then

Select one:

- a. f is not defined at origin.
- b. f is continuous everywhere. ✓
- c. The repeated limits do not exist at origin.
- d. $\lim_{(x,y)\to(0,0)} f(x,y)$ does not exist.

Your answer is correct.

The correct answer is: f is continuous everywhere.

Question 5

Incorrect

Mark 0.00 out of 2.00

If the simultaneous limit of a function f exists at (a,b) and has the same value along any three different paths, then

Select one:

- a. $\lim_{(x,y)\to(a,b)} f(x,y)$ exists.
- b. $\lim_{(x,y)\to(a,b)} f(x,y)$ may or may not exist.
- c. $\lim_{(x,y)\to(a,b)} f(x,y)$ does not exist. ✗
- d. none of these.

Your answer is incorrect.

The correct answer is: $\lim_{(x,y)\to(a,b)} f(x,y)$ exists.