$$f(x,y) = \begin{cases} x^2+y^2 & x,y \in \mathbb{Q}^c \\ 0 & \text{otherwise} \end{cases}$$

Continuity at $(0,0)$

$$\lim_{(y,x)\to(0,0)} f(x,y) = 0$$

Clearly continuous at $(0,0)$

[Also we can verify by taking path passing through $(0,0)$]

Differentiability at $(0,0)$

$$f_x(0,0) = \lim_{h\to 0} \frac{f(0+h)-f(0)}{h} = \lim_{h\to 0} \frac{h^2}{h} = 0$$

$$f_y(0,0) = 0$$

$$\Rightarrow \frac{f(h,k) - f(0,0) - f_x(0,0)\times h - f_y(0,0)\times k}{\sqrt{h^2+k^2}} = g(h,k) \to \text{should be exist}$$

$$\Rightarrow \frac{h^2+k^2 - 0 - 0}{\sqrt{h^2+k^2}} = g(h,k) = \sqrt{h^2+k^2}$$

$$\lim_{(x,y)\to(0,0)} g(h,k) = 0 \to \text{exist}$$

$\Rightarrow$ Differentable at $(0,0)$

$\Rightarrow$ But f is continuous only at $(0,0)$

$\Rightarrow$ f is not differentiable on $R \setminus (0,0)$

So option (c) is correct