14.2 Limits and Continuity

◎ 單選擇題

1. $\lim_{(x,y)\to(0,0)} \frac{x^{\frac{2}{3}} \sin y}{x^2+y^2} =$

(A) -1; (B) 0; (C) 1; (D) does not exist.

Ans: D [99 學年度]

2. Which of the following limits **exists**?

(A) $\lim_{(x,y)\to(0,0)} \frac{x^2-y^2}{x^2+y^2}$, (B) $\lim_{(x,y)\to(0,0)} \frac{x^2-\sin^2 y}{x^2+y^2}$,

(C) $\lim_{(x,y)\to(0,0)} \frac{x^3+y^2}{x^2+y^2}$, (D) $\lim_{(x,y)\to(0,0)} \frac{x^3+y\sin^2 y}{x^2+y^2}$.

Ans: D [100 學年度]

3. Consider

$$(1)\ \lim_{(x,y)\to(0,0)} \frac{x^2 y}{x^4+y^4}, \qquad (2)\ \lim_{(x,y,z)\to(0,0,0)} \frac{x^2 y}{x^2+y^4+z^4}.$$

(A) both limits (1) and (2) exist;

(B) first limit (1) exists; second (2) does not;

(C) second limit (2) exists; first (1) does not;

(D) both limits (1) and (2) do not exist.

Ans: C [101 學年度]

4. The limit $\lim_{(x,y)\to(0,0)} \frac{x\sin(y)}{x^2+y^2} =$

(A) 0; (B) $\frac{1}{2}$; (C) 1; (D) Does not exist.

Ans: D [104 學年度]

◎ 多選擇題

1. Which of the following statements are TRUE ?

(A) $\lim_{(x,y)\to(0,0)} \frac{xy^2}{x^2+y^4} = 0$;

(B) $\lim_{(x,y)\to(0,0)} \frac{3xy^2}{x^2+y^2} = 0$;

(C) $\lim_{(x,y)\to(0,0)} (x^2+y^2)\ln(x^2+y^2) = 0$;

(D) $\lim_{(x,y)\to(0,0)} \frac{\sin(x^2+y^2)}{x^2+y^2} = 1$.

Ans: BCD [102 學年度]