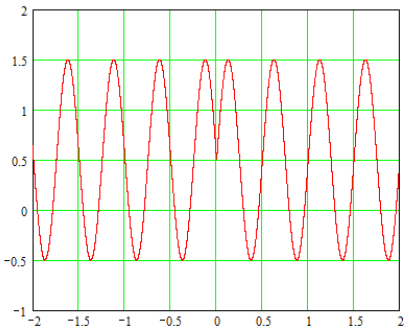
4.3 How Derivatives Affect the Shape of a Graph

單選題

1. The graph below comes from an experimental data. What is the best model function to describe the data ?



(A) $\cos(4\pi x)+0.5$.

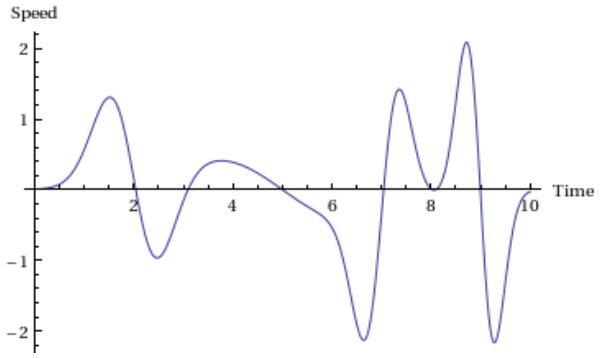
(B) $\sin(4\pi x)+0.5$.

(C) $\sin(4\pi|x|)+0.5$.

(D) $\cos(4\pi|x|)+0.5$.

Ans: C [100 學年度]

2. A particle moves on a line with speed shown in the following graph:



How many turnaround occurs in the particle's motion?

(A) 4; (B) 5; (C) 6; (D) 7.

Ans: B [101 學年度]

3. For what values of a does the curve $y = ax^3 + e^x$ have no **inflection point** ?

(A) -1; (B) 0; (C) 1; (D) 2.

Ans: B [103 學年度]

多選題

1. Which of the following statements are TRUE for $f(x)=\dfrac{\ln x^2}{2x^2}$?

   (A) f is increasing on $(-1,0)$.

   (B) f is concave downward on $(-1,0)$.

   (C) The graph of f has only one inflection point.

   (D) f has the absolute maximum value $\dfrac{1}{2e}$.

Ans: BD [99 學年度]

2. Let $F(x)$ be an anti-derivative of the function $\dfrac{1}{2}x^2+\dfrac{2}{1+x^2}$. Which of the following points are inflection points of F?

   (A) -1; (B) 0; (C) 1; (D) $\sqrt{3}$.

Ans: ABC [101 學年度]

3. Consider

$$f(x)=\begin{cases}0, & \text{if } x=0,\\ x\ln|x|, & \text{if } x\neq 0.\end{cases}$$

   Which of the following statements are **true**?

   (A) $f(x)$ is continuous at $x=0$;

   (B) $f(x)$ has a local minimum value;

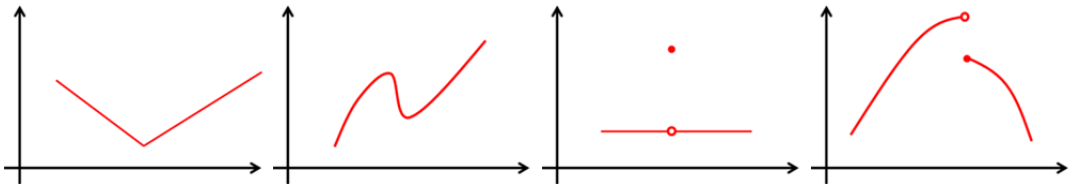
   (C) $f(x)$ has a local maximum value;

   (D) $f(x)$ has an inflection point.

Ans: ABCD [102 學年度]

4. Which figures have exactly one **critical** point?

(A) (B) (C) (D)



Ans: AD [103 學年度]

5. Let $f(x)=\frac{x^3}{x^2+\pi}$, then

(A) f is a continuous function,

(B) f does not have any asymptote,

(C) f has only one inflection point,

(D) f does not have maximum and minimun values.

Ans: AD [100 學年度]