Relationship between f, f', and f'' **(No Calculator)**

$y = f'(x)$
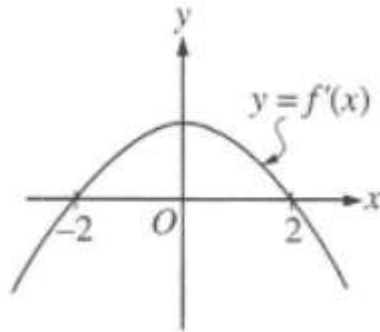
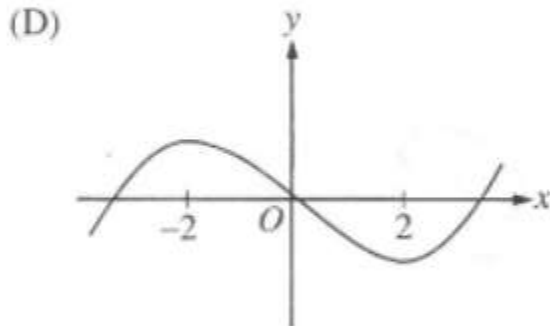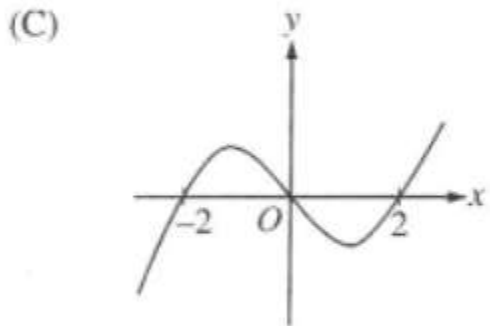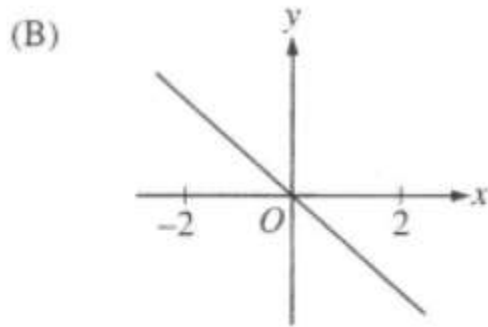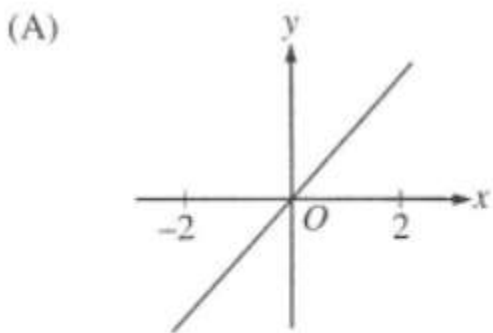**1997 #11**

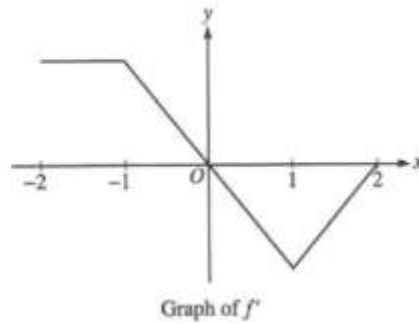The graph of the derivative of f is shown in the figure above. Which of the following could be the graph of f?

(A)

(B)

(C)

(D)

(E)
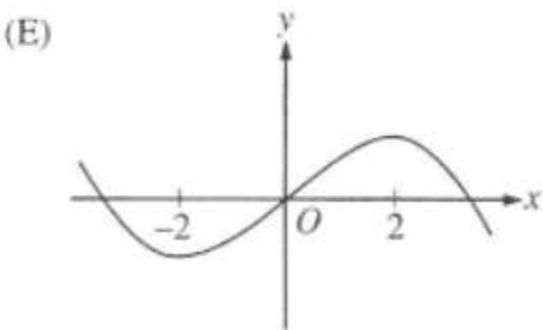
1997 #13

Let f be a function defined for all real numbers x. If $f'(x) = \dfrac{\left|4 - x^2\right|}{x - 2}$, then f is decreasing on the interval

(A) $(-\infty, 2)$ (B) $(-\infty, \infty)$ (C) (-2, 4)   (D) $(-2, \infty)$ (E) $(2, \infty)$

Graph of f'

2003 #7

The graph of f', the derivative of the function f, is shown above. Which of the following statements is true about f?

    (A) f is decreasing for $-1 \le x \le 1$.
    (B) f is increasing for $-2 \le x \le 0$.
    (C) f is increasing for $1 \le x \le 2$.
    (D) f has a local minimum at $x = 0$.
    (E) f is not differentiable at $x = -1$ and $x = 1$.

2003 #15

Let f be the function with derivative given by $f'(x) = x^2 - \dfrac{2}{x}$. On which of the following intervals is f decreasing?

    (A) $\left(-\infty, -1\right]$ only

    (B) $\left(-\infty, 0\right)$

    (C) $\left[-1, 0\right)$ only

    (D) $\left(0, \sqrt[3]{2}\right]$

    (E) $\left[\sqrt[3]{2}, \infty\right)$

2003 #18

| x	-4	-3	-2	-1	0	1	2	3	4
$g'(x)$	2	3	0	-3	-2	-1	0	3	2

The derivative g' of a function g is continuous and has exactly two zeros. Selected values of g' are given in the table above. If the domain of g is the set of all real numbers, then g is decreasing on which of the following intervals?

    (A) $-2 \le x \le 2$ only   (B) $-1 \le x \le 1$ only   (C) $x \ge -2$ (D) $x \ge 2$ only
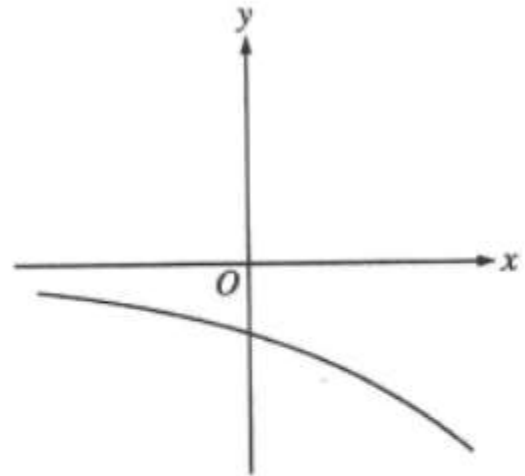   (E) $x \le -2$ or $x \ge 2$

2003 #10

The function f has the property that $f(x)$, $f'(x)$, and $f''(x)$ are negative for all real values x. Which of the following could be the graph of f ?
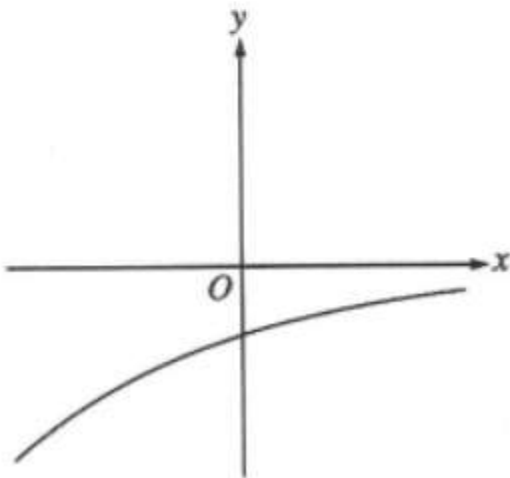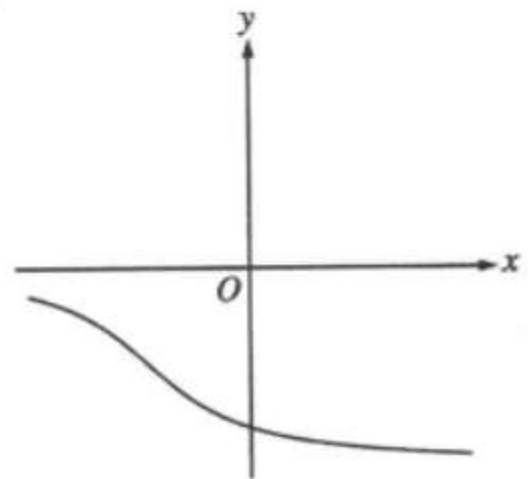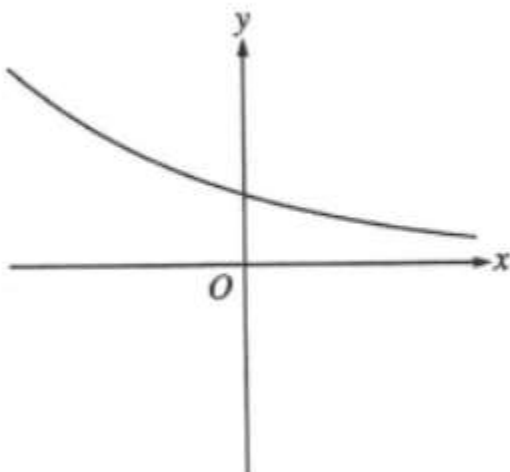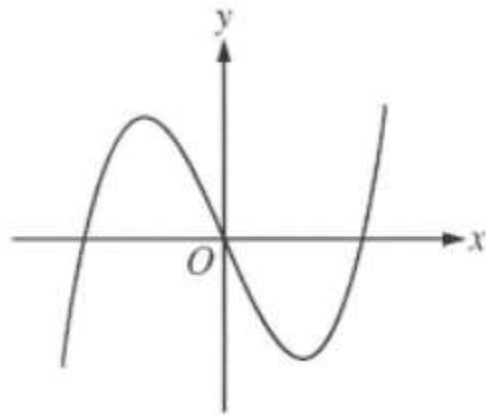
(A)
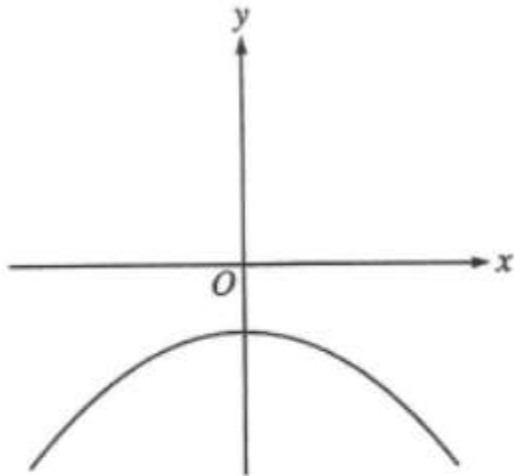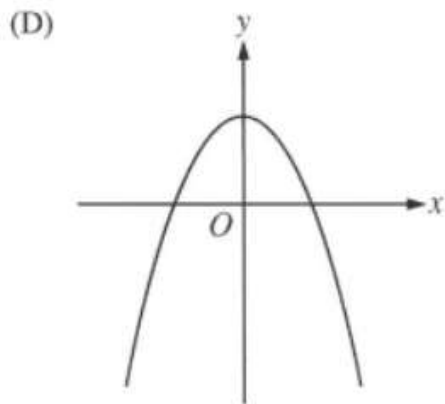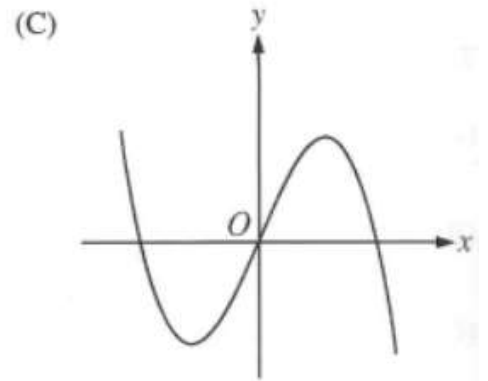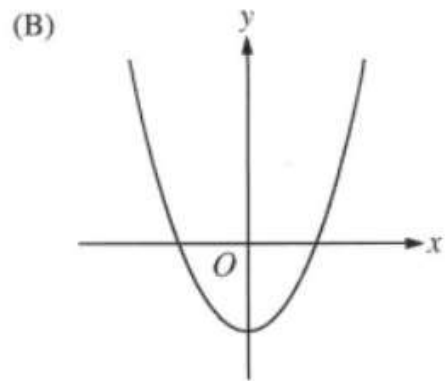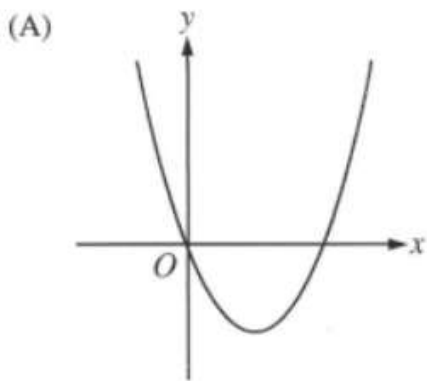

(B)

(C)

(D)

(E)

Graph of f

2008 #11

The graph of a function f is shown above. Which of the following could be the graph of f', the derivative of f?

(A)

(B)

(C)

(D)

(E)
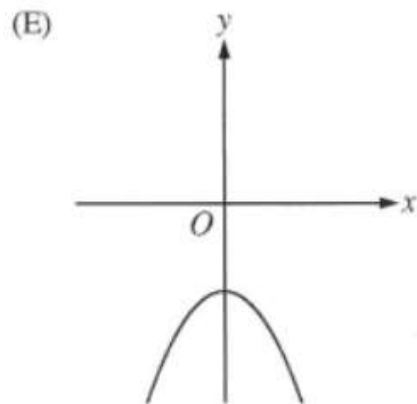
2008 #14

x	0	1	2	3
$f''(x)$	5	0	-7	4

The polynomial function f has selected values of its second derivative f'' given in the table above. Which of the following statements must be true?

    (A) f is increasing on the interval (0, 2).

    (B) f is decreasing on the interval (0, 2).

    (C) f has a local maximum at $x = 1$.

    (D) The graph of f has a point of inflection at $x = 1$.

    (E) The graph of f changes concavity in the interval (0, 2).