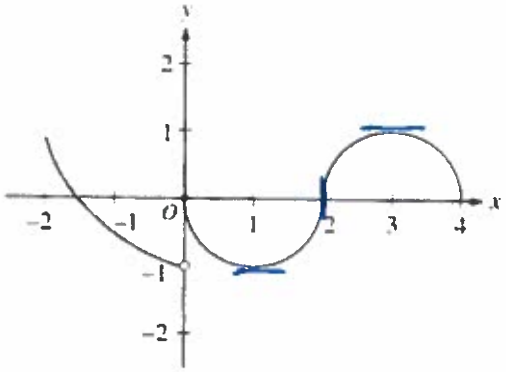
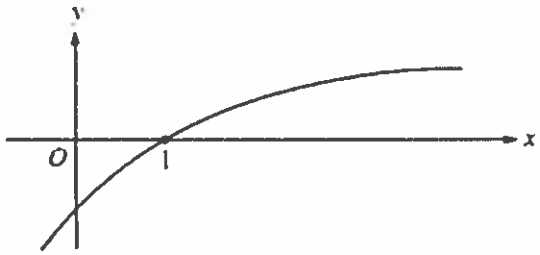
Who knows, all they have is 2 min per question? Key

AP Calculus AB: Multiple Choice Questions for Ch. 4



13. The graph of the function f shown in the figure above has a vertical tangent at the point $(2,0)$ and horizontal tangents at the points $(1,-1)$ and $(3,1)$. For what values of x, $-2<x<4$, is f not differentiable?

(A) 0 only (B) 0 and 2 only (C) 1 and 3 only (D) 0, 1, and 3 only (E) 0, 1, 2, and 3



17. The graph of a twice-differentiable function f is shown in the figure above. Which of the following is true?

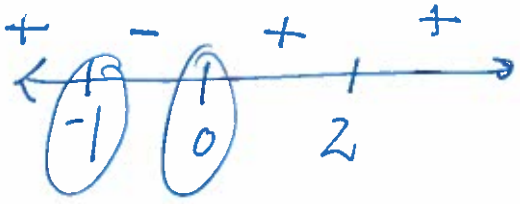
(A) $f(1)<f'(1)<f''(1)$
(B) $f(1)<f''(1)<f'(1)$
(C) $f'(1)<f(1)<f''(1)$
(D) $f''(1)<f(1)<f'(1)$
(E) $f''(1)<f'(1)<f(1)$

$f(1)=0$
$f'(1)>0$ increasing
$f''(1)<0$ concave down
$f'(1) > f(1) > f''(1)$

---

19. If $f''(x)=x(x+1)(x-2)^2$, then the graph of f has inflection points when $x=$

(A) -1 only (B) 2 only (C) -1 and 0 only (D) -1 and 2 only (E) -1, 0, and 2 only



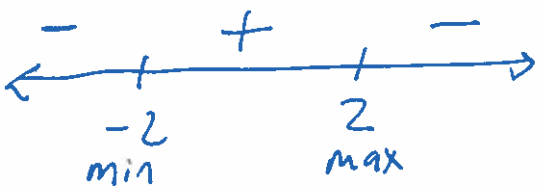
$f''(-10)$
$f''(-.5)$
$f''(1)$
$f''(10)$

Who knows, all they have is 2 min per question?_____

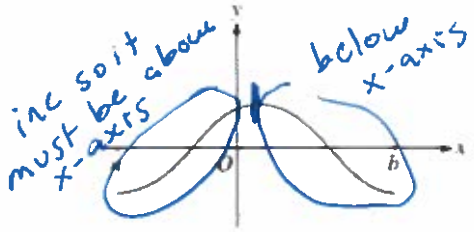
89. If g is a differentiable function such that $g(x) < 0$ for all real numbers x and if $f'(x) = (x^2 - 4)g(x)$, which of the following is true?

(A) f has a relative maximum at $x = -2$ and a relative minimum at $x = 2$.
(B) f has a relative minimum at $x = -2$ and a relative maximum at $x = 2$.
(C) f has relative minima at $x = -2$ and at $x = 2$.
(D) f has relative maxima at $x = -2$ and at $x = 2$.
(E) It cannot be determined if f has any relative extrema.

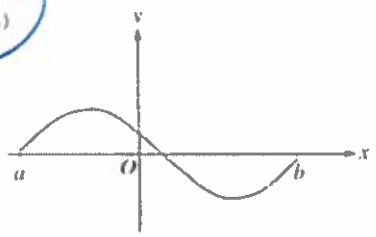
$f'(x) = 0$
$x^2 - 4 = 0$ ~~$g(x) = 0$~~
$x^2 = 4$
$x = \pm 2$

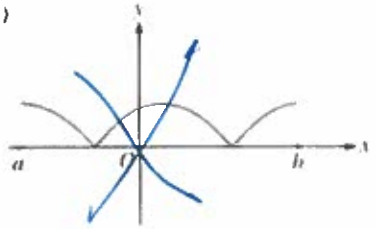


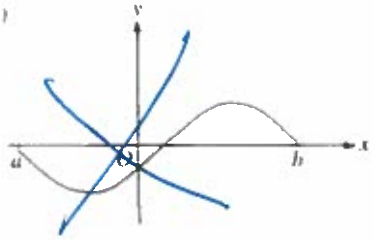
$f'(-10) =$
$f'(0) =$
$f'(10) =$

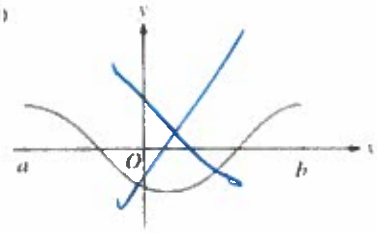


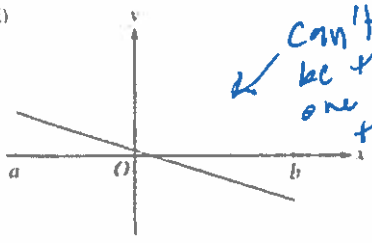
23. The graph of f is shown in the figure above. Which of the following could be the graph of the derivative of f?

(A)


(B)


(C)


(D)


(E)


Can't be this one because the slope never changed like the graph.

Who knows, all they have is 2 min per question?_____

22. What are all values of x for which the function f defined by $f(x) = (x^2 - 3)e^{-x}$ is increasing?

(A) There are no such values of x.
(B) $x < -1$ and $x > 3$
(C) $-3 < x < 1$
(D) $-1 < x < 3$
(E) All values of x

$f'(-10) =$
$f'(0) =$
$f'(4) =$

$f' = e^{-x}(2x) + (x^2-3)(-e^{-x})$
$e^{-x}(2x - x^2 + 3) = 0$
$-e^{-x}(x^2 - 2x - 3) = 0$
$-e^{-x}(x-3)(x+1) = 0$
$-e^{-x} = 0$ $x = 3$ $x = -1$

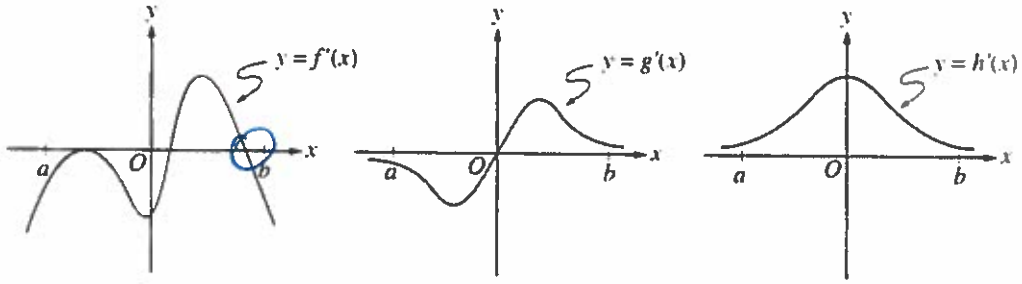
---

x	0	1	2
$f(x)$	1	k	2

IVT

26. The function f is continuous on the closed interval $[0,2]$ and has values that are given in the table above. The equation $f(x) = \frac{1}{2}$ must have at least two solutions in the interval $[0,2]$ if $k =$

(A) 0 (B) $\frac{1}{2}$ (C) 1 (D) 2 (E) 3



79. The graphs of the derivatives of the functions f, g, and h are shown above. Which of the functions f, g, or h have a relative maximum on the open interval $a < x < b$?

(A) f only
(B) g only
(C) h only
(D) f and g only
(E) f, g, and h

Calc

85. If the derivative of f is given by $f'(x) = e^x - 3x^2$, at which of the following values of x does f have a relative maximum value?

(A) –0.46 (B) 0.20 (C) 0.91 (D) 0.95 (E) 3.73

Who knows, all they have is 2 min per question?_____

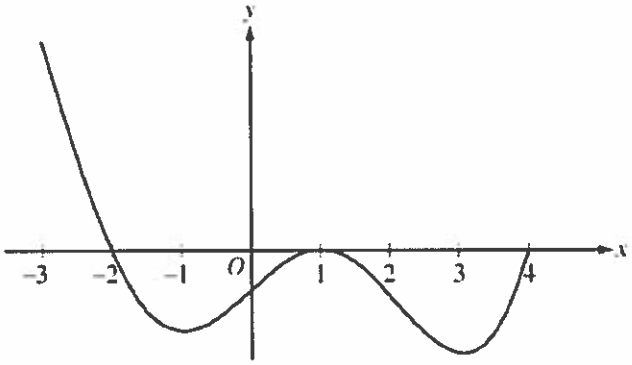
calc

85. If the derivative of f is given by $f'(x) = e^x - 3x^2$, at which of the following values of x does f have a relative maximum value?

(A) –0.46 (B) 0.20 (C) 0.91 (D) 0.95 (E) 3.73

Question 5

The figure above shows the graph of f', the derivative of a twice-differentiable function f, on the interval $[-3, 4]$. The graph of f' has horizontal tangents at $x = -1$, $x = 1$, and $x = 3$.



Graph of f'

(a) Find all x-coordinates at which f has a relative maximum. Give a reason for your answer.

(b) On what open intervals contained in $-3 < x < 4$ is the graph of f both concave down and decreasing? Give a reason for your answer.

(c) Find the x-coordinates of all points of inflection for the graph of f. Give a reason for your answer.

a) $x = -2$ because f' goes from + to − values

b) $(-2, -1)$ & $(1, 3)$ because f' is decreasing and negative

c) $x = -1, 1, 3$ because f' switches from inc to dec or dec to inc.