

FK 3a+d
6a

$$-\frac{u'}{\sqrt{1-u^2}}$$

1. If $f(x) = \frac{3x-2}{2x+3}$, then $f'(x) =$

- (A) $-\frac{13}{(2x+3)^2}$
- (B) $\frac{3}{(2x+3)^2}$
- (C) $\frac{5}{(2x+3)^2}$
- (D) $\frac{13}{(2x+3)^2}$
- (E) $\frac{12x+5}{(2x+3)^2}$

$$\frac{3(2x+3) - 2(3x-2)}{(2x+3)^2}$$

$$\frac{6x+9-6x+4}{(2x+3)^2}$$

$$\frac{13}{(2x+3)^2}$$

18. If $f(x) = \arccos(x^2)$, then $f'(x) =$

- (A) $\frac{1}{\sqrt{1-x^4}}$
- (B) $-\frac{2x}{\sqrt{1-x^4}}$
- (C) $\frac{2x}{\sqrt{1-x^4}}$
- (D) $\frac{-4x^3}{\sqrt{1-x^4}}$
- (E) $\frac{4x^3}{\sqrt{1-x^4}}$

4. For values of h very close to 0, which of the following functions best approximates

$$f(x) = \frac{\tan(x+h) - \tan x}{h}$$

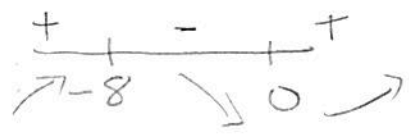
- (A) $\sin x$
- (B) $\frac{\sin x}{x}$
- (C) $\frac{\tan x}{x}$
- (D) $\sec x$
- (E) $\sec^2 x$

$f(x) = \tan x$
 $f'(x) = \sec^2 x$

21. The function f given by $f(x) = 9x^{2/3} + 3x - 6$ has a relative minimum at $x =$

- (A) -8 (B) $-\sqrt[3]{2}$ (C) -1 (D) $-\frac{1}{8}$ (E) 0

$$f'(x) = 6x^{-1/3} + 3$$



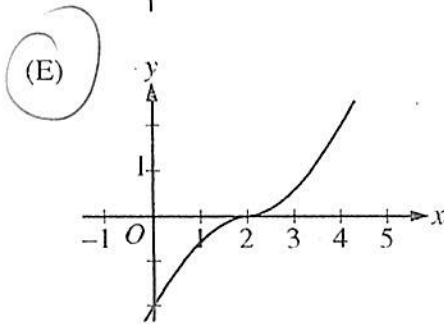
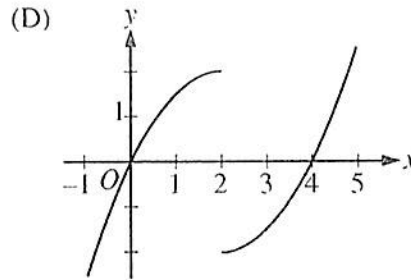
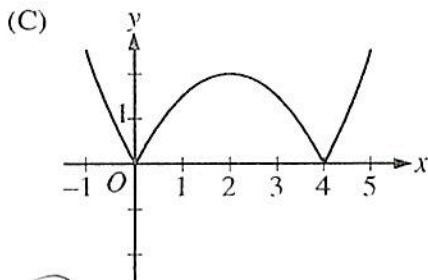
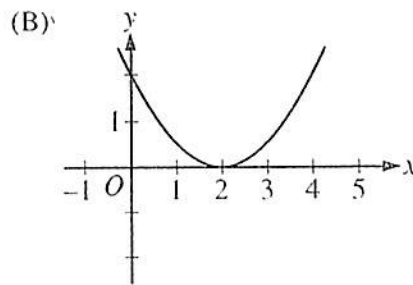
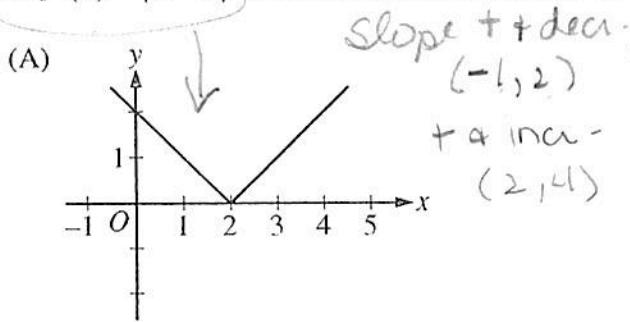
$$\frac{6}{\sqrt[3]{x}} + 3 = 0 \quad \frac{6}{\sqrt[3]{x}} = -3 \quad -3\sqrt[3]{x} = 6$$

$$(\sqrt[3]{x})^3 = (-2)^3$$

$$x = -8$$

Crit #'s: $x = -8$ & $x = 0$

16. If $f'(x) = |x - 2|$, which of the following could be the graph of $y = f(x)$?



19. What is the slope of the line tangent to the curve $y + 2 = \frac{x^2}{2} - 2\sin y$ at the point $(2, 0)$?

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

$$dy/dx = x - 2\cos y \, dy/dx$$

$$dy/dx(2,0) = \frac{2}{1+2\cos(0)} = \frac{2}{3}$$

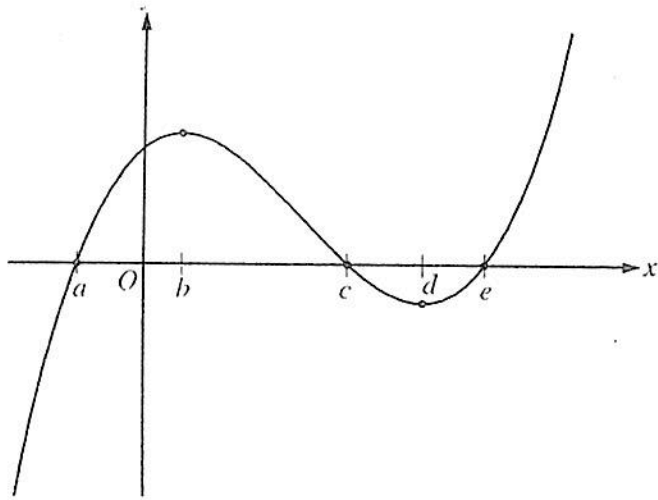
$$dy/dx + 2\cos y \, dy/dx = x$$

$$dy/dx = \frac{x}{1+2\cos y}$$

28. The function f is given by $f(x) = \sin\left(\frac{x+1}{x^2}\right)$. Which of the following statements are true?

- I. The graph of f has a horizontal asymptote at $y = 0$.
- II. The graph of f has a horizontal asymptote at $y = 1$.
- III. The graph of f has a vertical asymptote at $x = 0$.

- (A) I only
 (B) II only
 (C) III only
 (D) I and III only
 (E) II and III only

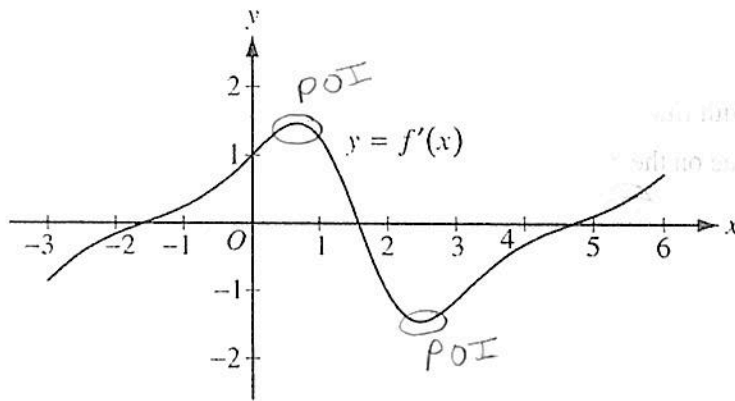


Graph of f

@ b
 $f''(x) < 0$
 $f'(x) = 0$
 $f(x) > 0$

77. The figure above shows the graph of the polynomial function f . For which value of x is it true that $f''(x) < f'(x) < f(x)$?

- (A) a (B) b (C) c (D) d (E) e



80. The figure above shows the graph of f' , the derivative of the function f , on the interval $[-3, 6]$. If the derivative of the function h is given by $h'(x) = 2f'(x)$, how many points of inflection does the graph of h have on the interval $[-3, 6]$?

- (A) One (B) Two (C) Three (D) Four (E) Five

$h''(x) = 2f''(x)$ $f''(x) = \text{slope of } f'(x)$

x	$f(x)$	$f'(x)$
0	1	1
1	3	4
2	11	13

$$f: (1, 3) \quad g: (3, 1)$$

91. The table above gives selected values for a differentiable and increasing function f and its derivative. If g is the inverse function of f , what is the value of $g'(3)$?

- (A) $\frac{1}{13}$ (B) $\frac{1}{4}$ (C) 1 (D) 4 (E) 13

$$f'(1) = 4 \rightarrow g'(3) = \frac{1}{4}$$

92. Let f be the function with first derivative defined by $f'(x) = \sin(x^3)$ for $0 \leq x \leq 2$. At what value of x does f attain its maximum value on the closed interval $0 \leq x \leq 2$?

- (A) 0 (B) 1.162 (C) 1.465 (D) 1.845 (E) 2

when $f'(x)$ changes
+ to -

graph
 $y = \sin(x^3)$
find zero
 $0 \leq x \leq 2$

Calc
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