

FRI 01-27-06

AP CALCULUS 2006
SAMPLE PROBLEMS (AFTER
TEST ON 4.4-4.6)

ANSWERS

① A

⑥ B

⑰ B

② B

⑧ C

⑱ D

③ C

⑨ E

⑲ D

⑤ C

⑪ B

$$8 \times 2 = 16$$

$$3 \times 3 = \underline{9}$$

$$\underline{\underline{25}}$$

1. What is $\lim_{h \rightarrow 0} \frac{\cos\left(\frac{3\pi}{2} + h\right) - \cos\left(\frac{3\pi}{2}\right)}{h}$?

(A) 1

(B) $\frac{\sqrt{2}}{2}$

(C) 0

(D) -1

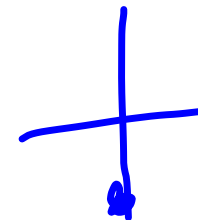
(E) The limit does not exist.

$$= \cos' \left(x = \frac{3\pi}{2} \right)$$

$$= -\sin \frac{3\pi}{2}$$

$$= -(-1)$$

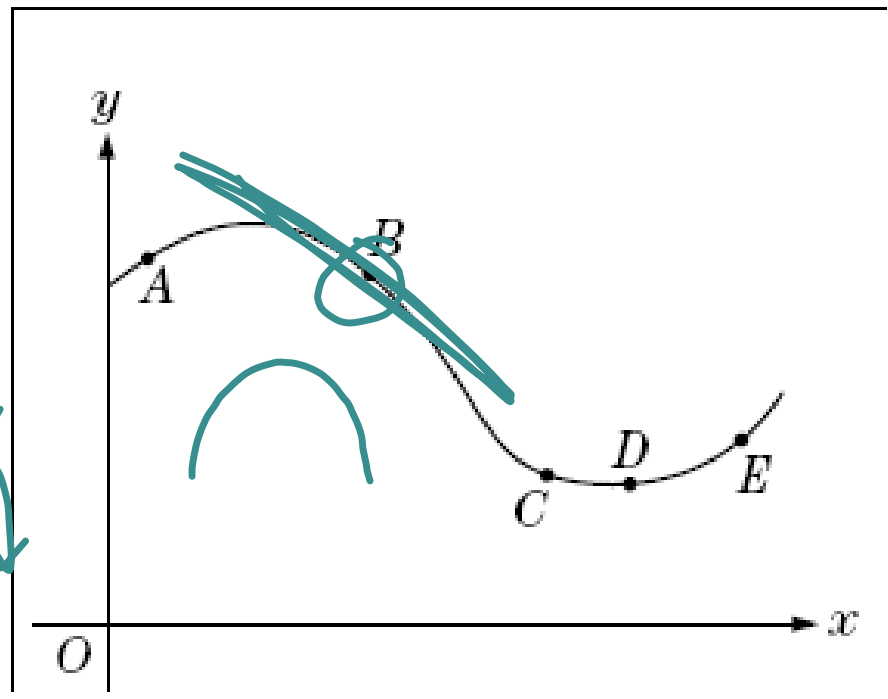
$$= 1$$



2. At which of the five points on the graph in the figure at the right are $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ both negative?

- (A) A
- (B) B**
- (C) C
- (D) D
- (E) E

DEC
6



3. The slope of the tangent to the curve $y^3x + y^2x^2 = 6$ at $(2, 1)$ is

- (A) $-\frac{3}{2}$
- (B) -1
- (C) $-\frac{5}{14}$
- (D) $-\frac{3}{14}$
- (E) 0

IMP.

PROD. RULE

5. Which of the following statements about the function given by $f(x) = x^4 - 2x^3$ is true?
- (A) The function has no relative extremum.
 - (B) The graph of the function has one point of inflection and the function has two relative extrema.
 - (C) The graph of the function has two points of inflection and the function has one relative extremum.
 - (D) The graph of the function has two points of inflection and the function has two relative extrema.
 - (E) The graph of the function has two points of inflection and the function has three relative extrema.

$f'(x) = 0$ CRIT. #'s

f'' ————— f'''

6. If $f(x) = \sin^2(3 - x)$, then $f'(0) =$

(A) $-2 \cos 3$

(B) $-2 \sin 3 \cos 3$ ✓

(C) $6 \cos 3$

(D) $2 \sin 3 \cos 3$ ✗

(E) $6 \sin 3 \cos 3$

CHAIN!
EVIL
- sin 6

8. What is the average rate of change of the function f given by $f(x) = x^4 - 5x$ on the closed interval $[0, 3]$?

- (A) 8.5
- (B) 8.7
- (C) 22
- (D) 33
- (E) 66

$$m_{\text{sec}} = \frac{f(b) - f(a)}{b - a}$$

9. The position of a particle moving along a line is given by $s(t) = 2t^3 - 24t^2 + 90t + 7$ for $t \geq 0$. For what values of t is the speed of the particle increasing?

- (A) $3 < t < 4$ only
- (B) $t > 4$ only
- (C) $t > 5$ only
- (D) $0 < t < 3$ and $t > 5$
- (E) $3 < t < 4$ and $t > 5$

$$v(t) = s'(t)$$
$$sp = |v(t)|$$

11. What is $\lim_{x \rightarrow \infty} \frac{x^2 - 4}{2 + x - 4x^2}$?
- (A) -2
- (B) $-\frac{1}{4}$
- (C) $\frac{1}{2}$
- (D) 1
- (E) The limit does not exist.

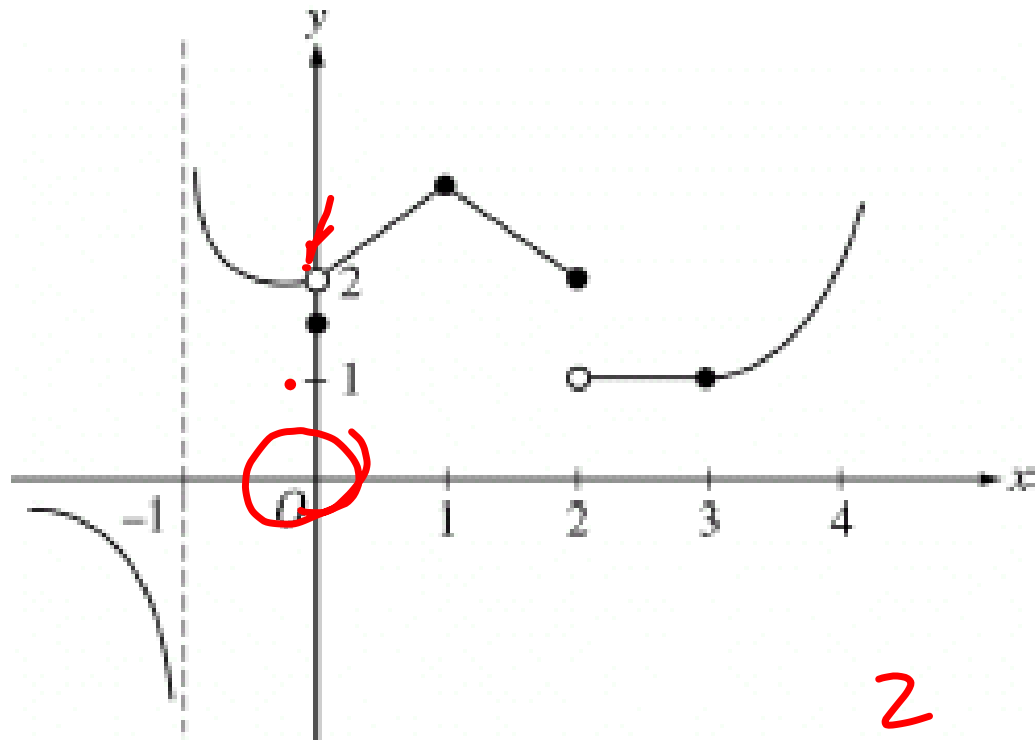
$$\frac{1 - \frac{4}{x^2}}{\frac{2}{x^2} + \frac{1}{x} - 4}$$

$$\frac{1}{-\frac{4}{x^2}}$$

$$\lim_{x \rightarrow 8} \frac{1}{x-8} = \infty$$

$$\lim_{x \rightarrow 5} \frac{1}{x-5} = \infty$$

17.



The graph of a function f is shown above. If $\lim_{x \rightarrow b} f(x)$ exists and f is not continuous at b , then $b =$

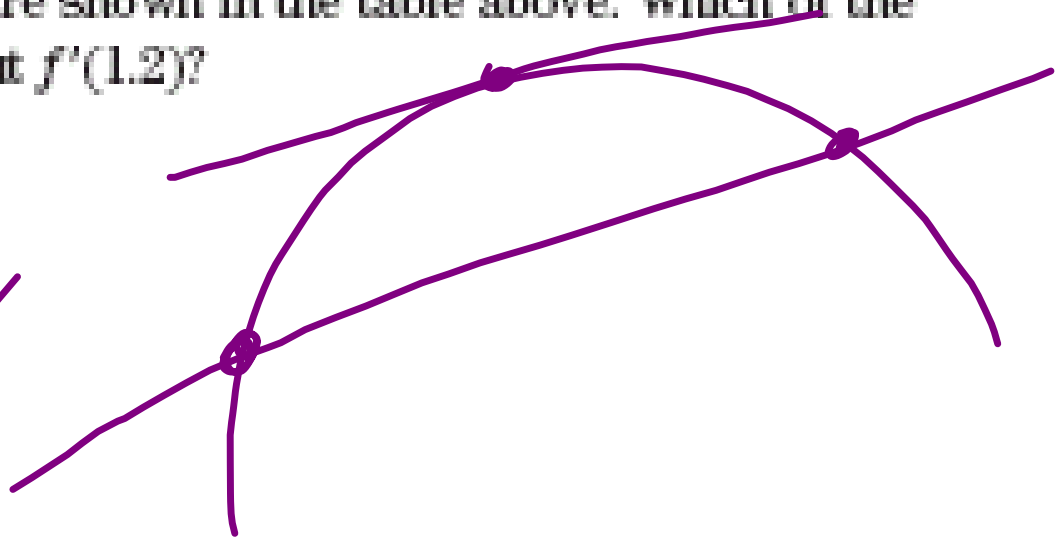
- (A) -1
- (B) 0
- (C) 1
- (D) 2
- (E) 3

18.

x	1.1	1.2	1.3	1.4
$f(x)$	4.18	4.38	4.56	4.73

Let f be a function such that $f''(x) < 0$ for all x in the closed interval $[1, 2]$. Selected values of f are shown in the table above. Which of the following must be true about $f'(1.2)$?

- (A) $f'(1.2) < 0$
- (B) $0 < f'(1.2) < 1.6$
- (C) $1.6 < f'(1.2) < 1.8$
- (D) $1.8 < f'(1.2) < 2.0$
- (E) $f'(1.2) > 2.0$



19. Two particles start at the origin and move along the x -axis. For $0 \leq t \leq 10$, their respective position functions are given by $x_1 = \sin t$ and $x_2 = e^{-2t} - 1$. For how many values of t do the particles have the same velocity?

- (A) None
- (B) One
- (C) Two
- (D) Three
- (E) Four

$$x_1' = x_2'$$

O.T.L.

- CORRECT TESTS - LEARN!
- CORRECT AP PROBLEMS - LEARN!
- AP P. 121
#4 (15 MINUTES; NO G.C.)