

REVIEW DAY

- Check HW 2002AB & organized notebook
(This isn't for my benefit but yours. Use it to study daily. Make a goal to review Calculus topic for a certain amount of time each day)

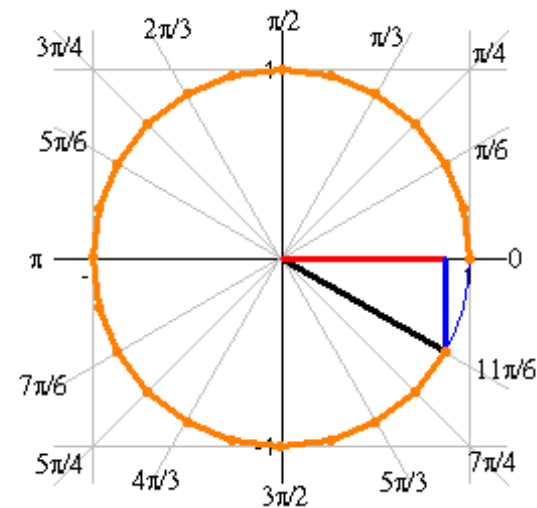
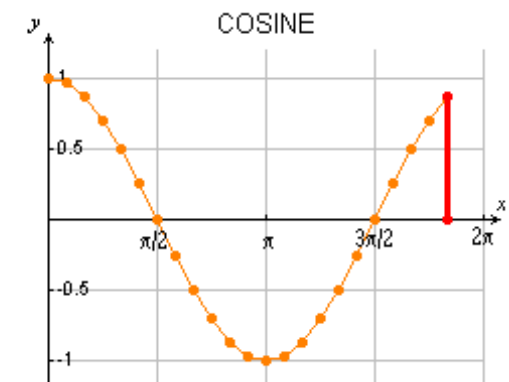
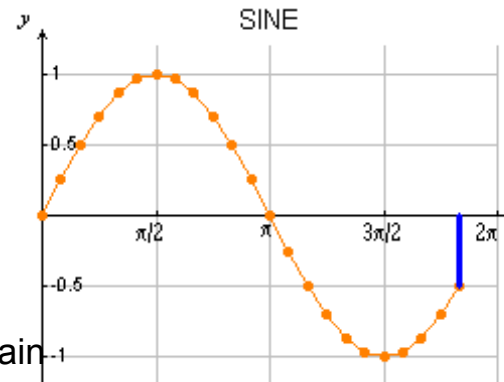
- Practice Trig Value Multiple Choice StudyCard (while I check HW)

- 2003AB multiple choice #27&28

- Increasing and Decreasing (Differentiation)

- HW: finish Differentiation - Inc & Dec

Do Back



$$\int \sec x \, dx = \ln |\sec x + \tan x| + C$$

f/fo

$$\int \frac{\sec x (\sec x + \tan x)}{\sec x + \tan x} \, dx$$

demon exp
()
"Deriv is outside"

$$\int \frac{\sec^2 x + \sec x \tan x}{\sec x + \tan x} \, dx$$

Let $u = \sec x + \tan x$

$$\frac{dx}{du} = (\sec x \tan x + \sec^2 x) \, dx$$

$$\int \frac{1}{u} \, du = \ln |u| + C$$

$$\int \tan x \, dx \left(\frac{\sec x}{\sec x} \right) = \ln |\sec x| + C$$

OR

$$- \ln |\cos x| + C$$

"Think rainbow rule"

NO Calculator for #1-10

1. If $f'(x) = \ln(x-2)$, then the graph of $y = f(x)$ is decreasing if and only if

- (A) $2 < x < 3$ (B) $0 < x$ (C) $0 < x < 1$ (D) $x > 1$ (E) $x > 2$

$$f'(x) = \ln(x-2) = 0$$

$$x-2 = 1$$

$$x = 3$$

$\ln 1 = 0$
$\ln e = 1$



2. Let $f(x) = \ln x + e^{-x}$. Which of the following is TRUE at $x = 1$?

- (A) f is increasing (B) f is decreasing (C) f is discontinuous
(D) f has a relative minimum (E) f has a relative maximum

$$f'(x) = \frac{1}{x} - e^{-x}$$

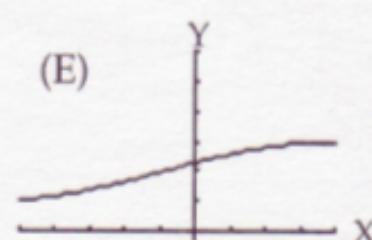
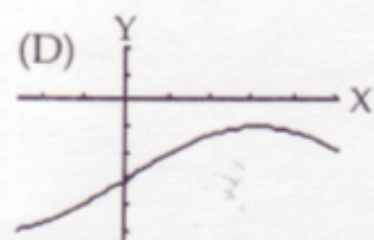
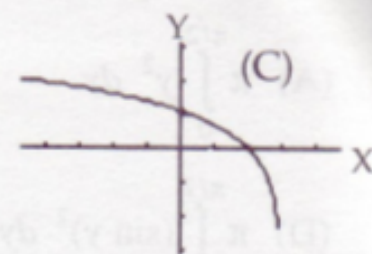
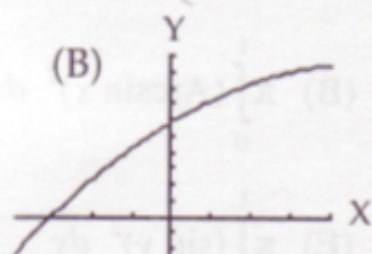
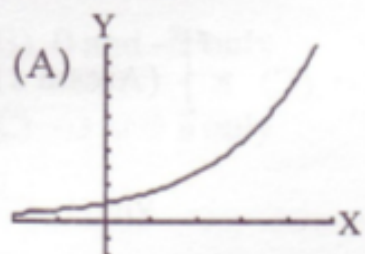
$$f'(1) = 1 - \frac{1}{e} > 0$$

3. The graph of the function $f(x) = 2x^{5/3} - 5x^{2/3}$ is increasing on which of the following intervals.

- I. $1 < x$ II. $0 < x < 1$ III. $x < 0$
(A) I only (B) II only (C) III only (D) I and II only (E) I and III only

4. Suppose that g is a function that is defined for all real numbers. Which of the following conditions assures that g has an inverse function?

- (A) $g'(x) < 1$, for all x (B) $g'(x) > 1$, for all x (C) $g''(x) > 0$, for all x
 (D) $g''(x) < 0$, for all x (E) g is continuous



Ans

5. Let f be the function defined by $f(x) = x^{2/3}(5 - 2x)$. f is increasing on the interval

- (A) $x < -5/2$ (B) $x > 0$ (C) $x < 1$ (D) $0 < x < 5/8$ (E) $0 < x < 1$

7. If $f(x) = 4x^3 - 21x^2 + 36x - 4$, then the graph of f is decreasing and concave up on the interval

- (A) $\left(\frac{3}{2}, 2\right)$ (B) $\left(-\infty, \frac{7}{4}\right)$ (C) $\left(\frac{7}{4}, \infty\right)$ (D) $\left(\frac{7}{4}, 2\right)$ (E) $\left(\frac{3}{2}, \frac{7}{4}\right)$

8. A region in the plane is bounded by the graph of $y = \frac{1}{x}$, the x -axis, the line $x = m$ and the line $x = 3m$, $m > 0$. The area of this region

- (A) is independent of m (B) increases as m increases (C) decreases as m increases
(D) decreases for all $m < \frac{1}{3}$ (E) increases for all $m < \frac{1}{3}$

9. Which of the following is true about the graph $f(x) = \ln|x^2 - 4|$ in the interval $(-2, 2)$?

- (A) f is increasing (B) f attains a relative minimum at $(0, 0)$
(C) f has a range of all real numbers (D) f is concave down
(E) f has an asymptote at $x = 0$

21. If $f(x)$ is defined on $-\pi \leq x \leq \pi$ and $\frac{dy}{dx} = \frac{\cos x}{x^2 + 1}$, which of the following statements about the graph of $y = f(x)$ is true?
- (A) The graph has no relative extremum
 - (B) The graph has one point of inflection and two relative extrema
 - (C) The graph has two points of inflection and one relative extremum
 - (D) The graph has two points of inflections and two relative extrema
 - (E) The graph has three points of inflections and two relative extrema

22. A particle moves along a straight line with its position at any time $t \geq 0$ given by $s(t) = \int_0^t (x^3 - 2x^2 + x) dx$, where s is measured in meters and t in seconds. The maximum velocity attained by the particle on the interval $0 \leq t \leq 3$ is
- (A) 0.333 m/s (B) 0.148 m/s (C) 1 m/s (D) 3 m/s (E) 12 m/s

23. Suppose the continuous function f is defined on the closed interval $[0,3]$ such that its derivative f' is defined by $f'(x) = e^x \sin(x^2) - 1$. Which of the following are true about the graph of f ?
- I. f has exactly one relative maximum point.
 - II. f has two relative minimum points
 - III. f has two inflection points
- (A) I only (B) II only (C) III only (D) I and II only (E) I, II, III

1A 2A 3E 4B 5E 6B 7D 8A 9D 10D
11D 12E 13D 14A 15D 16D 17E 18D 19B 20B 21E 22E 23D