Multiple Choice Questions Similar to 1997
Created by Former Students!

NO CALCULATOR SECTION

1. $\int_0^1 \left(6x^2 - 8x\right) dx$

(A) -2
(B) 2
(C) 12
(D) 0

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2. $F(x) = x\sqrt{6x-7}$ Find $F'(x)$

A. $\dfrac{x+2}{2\sqrt{6x-7}}$

B. $\dfrac{2x\sqrt{(6x-7)^3} + (6x+7)}{3}$

C. $\dfrac{9x-7}{\sqrt{6x-7}}$

D. $\dfrac{3}{\sqrt{6x-7}}$

E. $\dfrac{\sqrt{6x-7}}{2x}$

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3. If $\int_c^d f(x)dx = 3c + 2d,$ then $\int_c^d (f(x) - 4)dx =$

A. $\frac{3}{2}c^2 + d^2 + 4d - 4c$ B. $6d - c$ C. $7c - 2d$ D. $-c - 2d$ E. None of these

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4. If $f(x) = -2x^4 - x + \frac{1}{x}$, then $f'(-1) =$

(A) -10 (B) 7 (C) -7 (D) 6 (E) 8

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5. The graph of $y = x^4 - 6x^3 - 24x^2 + 2x$ is concave down for:

(A) $x > 0$
(B) $1 < x < 4$
(C) $-4 < x < -1$
(D) $x < 0$
(E) $-1 < x < 4$

Problem #6

$\int \left(e^{\frac{x}{3}} + 4 \right) dx =$

(a) $\frac{1}{3}e^{\frac{x}{3}} + C$ (b) $3e^{\frac{x}{3}} + C$ (c) $3e^{\frac{x}{3}} + 4x + C$ (d) $e^{\frac{x}{3}} + 4x + C$ (e) $e^{\frac{x}{3}} + \frac{1}{3} + C$

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7. $\frac{d}{dx}\sin^2\left(x^3\right) =$

A) $6x^2\sin\left(x^3\right)$

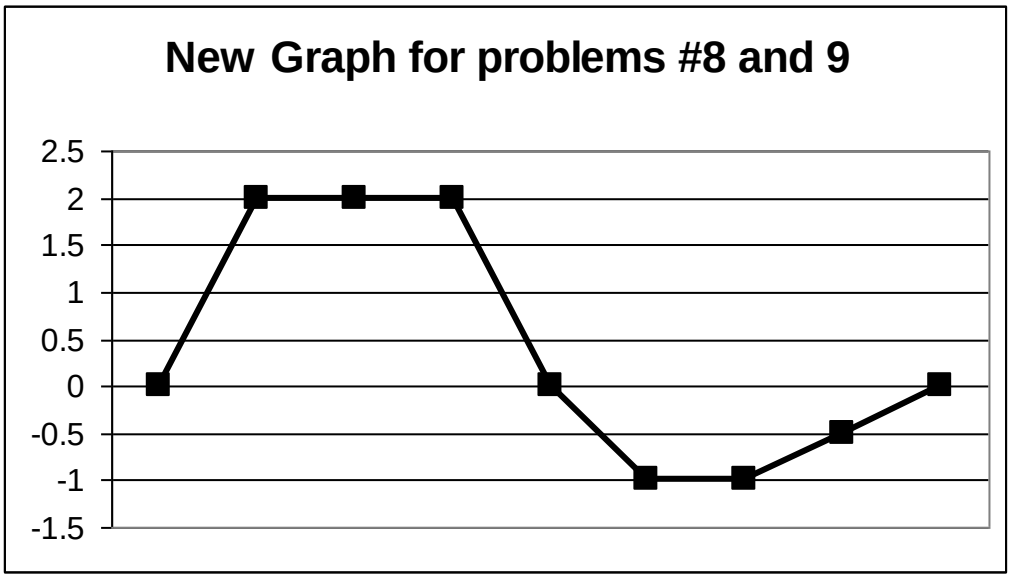
B) $\cos^2\left(x^3\right)$

C) $6x^2\sin\left(x^3\right)\cos\left(x^3\right)$

D) $-6x^2\sin\left(x^3\right)\cos\left(x^3\right)$

E) $6\sin\left(x^3\right)\cos\left(x^3\right)$

#8&9



New Problem: A bug begins to crawl up a vertical wire at time t=0. The velocity v of the bug at time t, $0 \le 0 \le 8$, is given by the function whose graph is shown above. Each point represents one unit of time.

8. At which value of t does the bug change direction?

a. 1 b. 3 c. 4 d. 6 e. 8

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9. What is the total distance the bug traveled from t=0 to t=8?

a. 5 b. 2.5 c. 7.5 d. 8.5 e. 9.25

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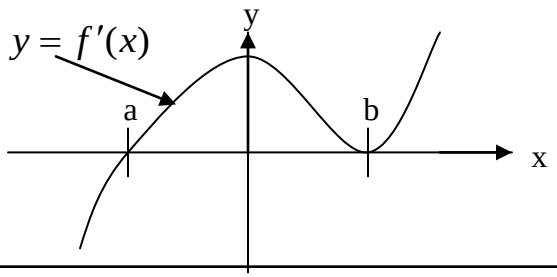
#10 An equation of the line tangent to the graph of y = sin (4x) at x = $\frac{\pi}{2}$

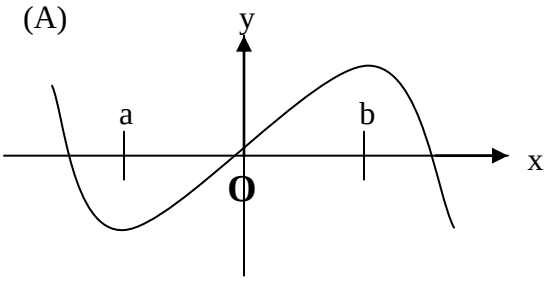
(A) $y = -4x + 2\pi$ (B) $y = x - \frac{\pi}{2}$

(C) $y = 4x - 2\pi$ (D) $y - 1 = 4(x - 2\pi)$

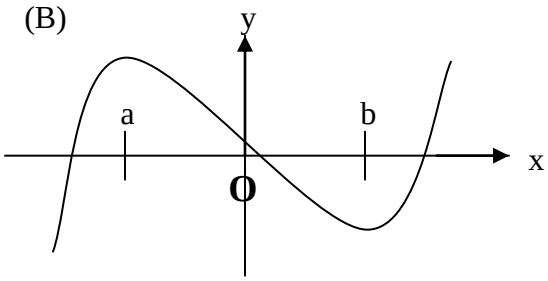


11. The graph of the **derivative** of f is shown in the figure above. Which of the following could be the graph of f ?

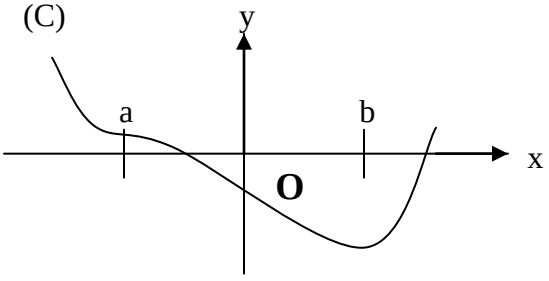
(A)



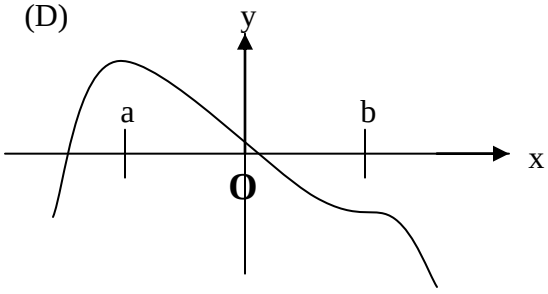
(B)



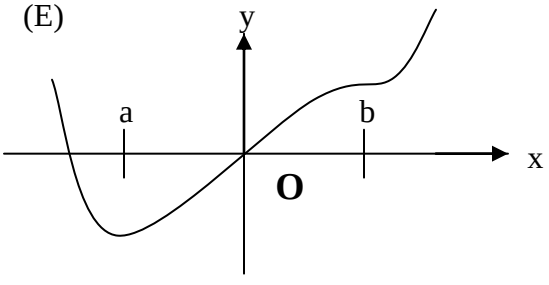
(C)



(D)



(E)



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12. At what point on the graph of $y = -3x^2$ is the tangent line perpendicular to the line defined by $5x - 2y = 7$.

A. $\left(-\frac{5}{12}, -\frac{75}{144}\right)$ B. $\left(\frac{1}{15}, -\frac{3}{225}\right)$ C. (5, 3) D. $\left(\frac{5}{12}, -\frac{75}{144}\right)$ E. None of these

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13. Let f be a function defined for all real numbers x. If $f'(x) = \frac{9-x^2}{x-3}$, then f is decreasing on the interval

(A) $(-3, \infty)$ (B) $(-\infty, -3)$ (C) $(-3, \infty)$, $x \neq 3$ (D) $(-\infty, \infty)$, $x \neq 3$ (E) $(3, \infty)$

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14. Let f be a differentiable function such that $f(4) = 1$ and $f'(4) = 4$. Using the tangent line to the graph of f at x = 4, find an approximation to a zero of f. The approximation is:

A) 1.5 B) 2.9 C) 3.8 D) 4.9 E) 5.1

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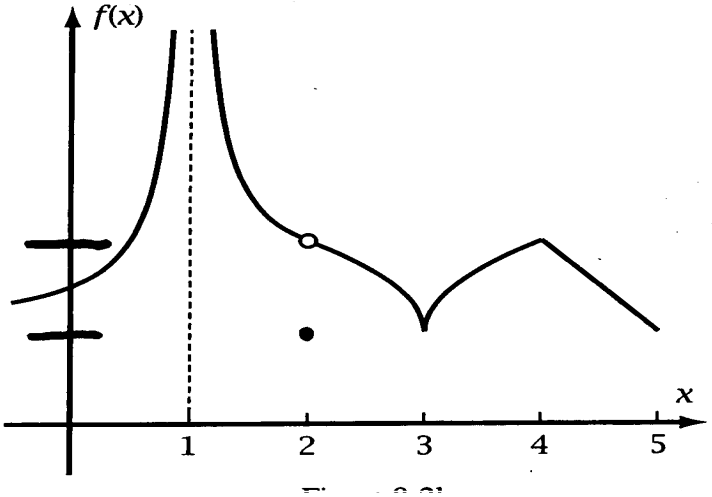
Problem #15



15. The graph of the function f is shown the figure above. Which of the following statements about f is true?

(A) $\lim_{x \to 2} f(x) = f(4)$

(B) $f(2) = f(4)$

(C) $f(2) = \lim_{x \to 4} f(x)$

(D) $\lim_{x \to 2} f(x)$ Does Not Exist

(E) $f'(3) = 1$

#16

Find the area of the region enclosed by the graph of $x = 0$, $y = \sqrt{x} + 2$ and the line $y = 4$ in the first Quadrant.

A) $\frac{56}{3}$ B) $\frac{8}{3}$ C) $\frac{40}{3}$ D) $-\frac{8}{3}$ E) 4

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17. If $2x^2 - y^2 = 4$, what is the value of $\frac{d^2y}{dx^2}$ at the point (2,2)

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

Problem 18

$\int_0^{\frac{\pi}{3}} \frac{\sin(x)e^{\sec x}}{\cos^2 x}dx =$

A) $e - \frac{1}{e}$ B) $e - 1$ C) 1 D) $e(e\text{-}1)$ E) $\frac{1-e^2}{e}$

#19. If f(x) = ln ($x^4 - 1$), then f'(x) =

A. $\frac{5x}{x^4 - 1}$ B. $\frac{1}{x^4 - 1}$ C. $\frac{4x^3}{x^4 - 1}$

D. $\frac{3x^3}{x^3 - 1}$ E. $\frac{(4x)^3}{x^4 - 1}$

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#20. Find the average value of sin (x) on the interval $[-1,4]$.

A. $\frac{-\cos(4)+\cos(-1)}{5}$ B. $\frac{\cos(-1)+\cos(4)}{5}$

C. $\frac{-\cos(4)+\cos(-1)}{5}$ D. $\frac{\cos(4)-\cos(-1)}{3}$

E. $\frac{\sin(4)-\sin(-1)}{5}$

21.) $\lim_{x\to\pi} \frac{x}{\tan x}$ is

(A) ∞ (B) $-\infty$ (C) 1 (D) –1 (E) nonexistent

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22. On what interval(s) is $f(x)=e^x(2x^2-x-1)$ decreasing?

A. $(-\infty,-2]\cup[0.5,\infty)$
B. $(-\infty,-0.5)$
C. $[-2,0.5]$
D. $(1,\infty)$
E. $(-\infty,-2)$

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23) If the region enclosed by the x axis, the curve $\sqrt{y}$ = x, and the line x = 2 then the volume of the solid rotated around the x axis generated is

A) $\frac{32\pi}{5}$ B) $\frac{32}{5}$ C) 16π D) 16

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24. (Offspring) The expression $\frac{1}{15}\left(\left(\frac{16}{15}\right)^2+\left(\frac{17}{15}\right)^2+\left(\frac{18}{15}\right)^2 \ldots+\left(\frac{30}{15}\right)^2\right)$ is a Reimann Sum approximation for

A. $\int_0^2\left(\frac{x}{15}\right)^2 dx$

B. $\frac{1}{15}\int_1^2\left(x^2\right) dx$

C. $\int_1^2\left(x^2\right) dx$

D. $\frac{1}{15}\int_0^{15}\left(x^2\right) dx$

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25. $\int x\sin(3x)dx$ = NOTE: This type is no longer on AB, but do it anyway!

A) $-\frac{1}{3}x\cos(3x)+\frac{1}{9}\sin(3x)+C$

B) $\frac{1}{3}x\cos(3x)+\frac{1}{9}\sin(3x)+C$

C) $\frac{1}{3}x\cos(3x)-\frac{1}{6}\sin(3x)+C$

D) $-\frac{1}{6}\sin(3x)+\frac{1}{3}\cos(3x)+C$

E) $3\sin(3x)$

The Calculator Active questions will be in a different packet!