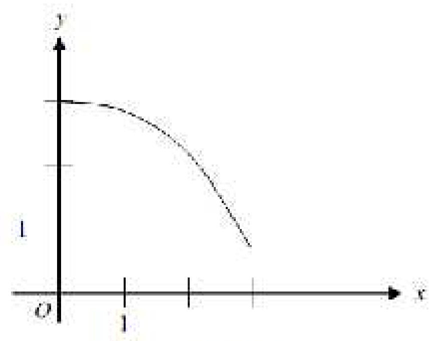
Name____ Date___________________ Per__________

AP Calculus: Test—4.1-4.2. CALCULATOR PERMITTED

PART I: Multiple Choice. Put the Capital Letter of the correct answer choice in the space to the left of each problem number.

_____ 1. (2008-10) The graph of the function *f* is shown below for $0 \le x \le 3$. Of the following, which has the least value?



Graph of *f*

(A) $\int_1^3 f(x)\,dx$

(B) Left Riemann sum approximation of $\int_1^3 f(x)\,dx$ with 4 subintervals of equal length

(C) Right Riemann sum approximation of $\int_1^3 f(x)\,dx$ with 4 subintervals of equal length

(D) Midpoint Riemann sum approximation of $\int_1^3 f(x)\,dx$ with 4 subintervals of equal length

(E) Trapezoidal sum approximation of $\int_1^3 f(x)\,dx$ with 4 subintervals of equal length

_____ 2. (2008-79) If $\int_{-5}^{2} f(x)\,dx = -17$ and $\int_{5}^{2} f(x)\,dx = -4$, what is the value of $\int_{-5}^{5} f(x)\,dx$?

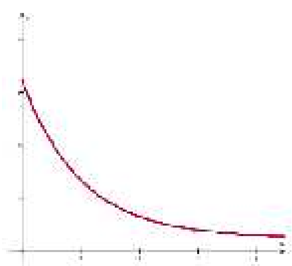
(A) -21 (B) -13 (C) 0 (D) 13 (E) 21

_____ 3. (2008BC-81) Let *f* and *g* be continuous functions for $a \le x \le b$. If $a < c < b$, $\int_a^b f(x)\,dx = P$, $\int_c^b f(x)dx = Q$, $\int_a^b g(x)\,dx = R$, and $\int_c^b g(x)\,dx = S$, then $\int_a^c \left(f(x) - g(x)\right)dx =$

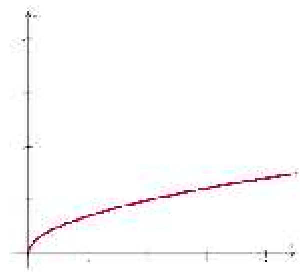
(A) $P - Q + R - S$ (B) $P - Q - R + S$ (C) $P - Q - R - S$ (D) $P + Q - R - S$ (E) $P + Q - R + S$

_____ 4. (2003-85) If a trapezoidal sum overapproximates $\int_0^4 f(x)\,dx$, which of the following could be the graph of $y = f(x)$?

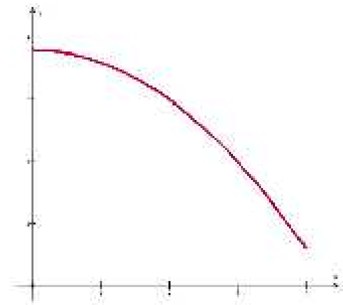
(A)



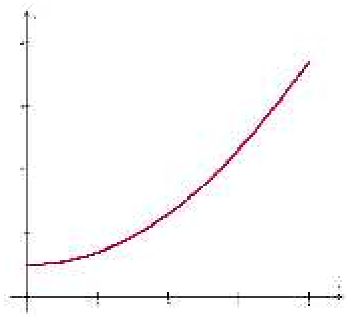
(B)



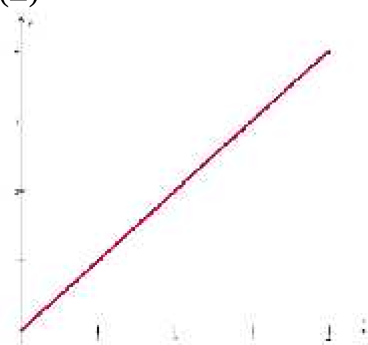
(C)



(D)



(E)



_____ 5. (2008BC-8) The function *f* is continuous on the closed interval $[2,13]$ and has values as shown in the table below. Using the intervals $[2,3]$, $[3,5]$, $[5,8]$, and $[8,13]$, what is the approximation of $\int_2^{13} f(x)\,dx$ obtained from a left Riemann sum?

x	2	3	5	8	13
$f(x)$	6	–2	–1	3	9

(A) 6 (B) 14 (C) 28 (D) 32 (E) 50

_____ 6. (1998-82) If $f(x) = g(x) + 7$ for $3 \le x \le 5$, then $\int_3^5 [f(x) + g(x)]\,dx =$

(A) $2\int_3^5 g(x)\,dx + 7$ (B) $2\int_3^5 g(x)\,dx + 14$ (C) $2\int_3^5 g(x)\,dx + 28$ (D) $\int_3^5 g(x)\,dx + 7$ (E) $\int_3^5 g(x)\,dx + 14$

_____ 7. (2003BC-25) The function *f* is continuous on the closed interval $[2,14]$ and has values as show in the table below. Using three subintervals indicated by the data, what is the approximation of $\int_2^{14} f(x)\,dx$ found by using a right Riemann sum?

x	2	5	10	14
$f(x)$	12	28	34	30

(A) 296 (B) 312 (C) 343 (D) 374 (E) 390

_____ 8. (1998-85) The function *f* is continuous on the closed interval $[2,8]$ and has values that are given in the table below. Using three subintervals indicated by the data, what is the trapezoidal approximation of $\int_2^{8} f(x)\,dx$?

x	2	5	7	8
$f(x)$	10	30	40	20

(A) 110 (B) 130 (C) 160 (D) 190 (E) 210

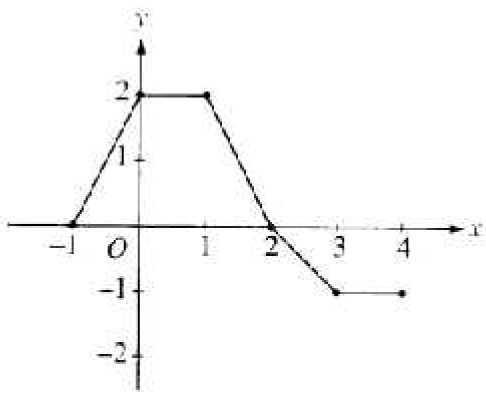
_____ 9. The most general antiderivative of $f(x) = (\sec x)\left(\frac{\cot x}{\sin x}\right)$ is

(A) $\sec x \tan x + C$ (B) $-\csc x \cot x + C$ (C) $-\cot x + C$ (D) $\cos x + C$

_____ 10. If $\int_{-1}^{3} f(x)dx = 2$ and $\int_{2}^{3} f(x)dx = -1$, find $\int_{-1}^{2} [2f(x)]dx$

(A) 2 (B) -3 (C) 3 (D) -6 (E) 6

_____ 11. The graph of a piecewise-linear function *f*, for $-1 \le x \le 4$, is shown below. What is the value of $\int_{-1}^{4} f(x)dx$?



(A) 1 (B) 2.5 (C) 4 (D) 5.5 (E) 8

Short Answer: Evaluate the following indefinite integrals. Remember, rewriting is the key, and don't forget your $+C$.

Evaluate 4 of 6 of the following integrals (or get them all correct for amazing bonus points).

12. $\int e\csc x\tan^2 x\,dx$

13. $\int \frac{2}{5\cdot 7^{-x}}\,dx$

14. $\int \left(\frac{4x+3\sqrt[3]{x}-x^2}{2x}\right)dx$

15. $\int 2\sqrt{x}\left(3x-2\right)^2\,dx$

16. $\int \left(\frac{4}{\text{®}x}-\frac{2}{\sin^2 x}\right)dx$

17. $\int \left(\frac{e^{-x}-1}{e^{-x}}\right)dx$