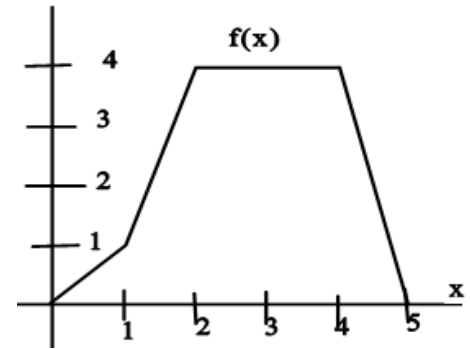


AB Calculus Chapter 6 Review

FRQ: Complete on your own paper showing appropriate work.



1. From the graph of $f(x)$ at the right, find
- a) $\int_0^2 f(x)dx$ b) $\int_5^2 f(x)dx$ c) the average value of $f(x)$ on $[1,4]$

2. Use the Fundamental Theorem of Calculus to find $\int_1^2 (e^x + 2x - 3)dx$.

3. $\int_{-2}^3 |x - 2|dx$

4. Find A. $\frac{d}{dx} \left(\int_2^x \sqrt{t^3 - 3t^2 + 4t} dt \right)$ B. $\frac{d}{dx} \left(\int_2^{x^3} \frac{1 - \sin t^2}{2t} dt \right)$ C. $\frac{d}{dx} \left(\int_1^{\sin^2(3x)} \frac{2t+1}{e^t} dt \right)$

5. Evaluate each of the following

A $\int \frac{4}{1+x^2} - 3\cos(x) dx$	B $\int \frac{\sec x \tan x}{4} dx$	C $\int \frac{-2}{7\sqrt{1-x^2}} + 8\sin(x) dx$	D $\int \frac{5\csc(x)\cot(x)}{6} dx$
E $\int 3\csc^2 x - 2\sec^2 x dx$	F $\int \frac{9}{4}\sqrt{x} + \frac{8}{15}\sqrt[3]{x} dx$	G $\int_0^2 \left(2x^3 - 6x + \frac{3}{\sqrt{x}} \right) dx$	H *** break it up first *** $\int_1^9 \frac{2t^2 + t^2\sqrt{t} - 1}{t^2} dt$

MC: On your own paper, show appropriate work then choose the correct letter.

Non-Calculator

1. $\int_1^2 \frac{1}{x^2} dx =$

- A. $-\frac{1}{2}$ B. $\frac{7}{24}$ C. $\frac{1}{2}$ D. 1 E. $2 \ln 2$

2. $\int_0^x \sin(t) dt =$

- A. $\sin x$ B. $-\cos x$ C. $\cos x$ D. $\cos x - 1$ E. $1 - \cos x$

3. $\int_1^e \left(\frac{x^2 - 1}{x} \right) dx =$

- A. $e - \frac{1}{e}$ B. $e^2 - e$ C. $\frac{e^2}{2} - e + \frac{1}{2}$ D. $e^2 - 2$ E. $\frac{e^2}{2} - \frac{3}{2}$

4. If f is a linear function and $0 < a < b$, then $\int_a^b f''(x) dx =$

- A. 0 B. 1 C. $\frac{ab}{2}$ D. $b - a$ E. $\frac{b^2 - a^2}{2}$

5. If $F(x) = \int_0^x \sqrt{t^3 + 1} dt$, then $F'(2) =$
 A. -3 B. -2 C. 2 D. 3 E. 18
6. What are all values of k for which $\int_{-3}^k x^2 dx = 0$?
 A. -3 B. 0 C. 3 D. -3 and 3 E. -3, 0, and 3
8. A particle with velocity at any time t given by $v(t) = e^t$ moves in a straight line. How far does the particle move from $t = 0$ to $t = 2$?
 A. $e^2 - 1$ B. $e - 1$ C. $2e$ D. e^2 E. $\frac{e^3}{3}$
9. $\int \sec^2 x dx =$
 A. $\tan x + C$ B. $\csc^2 x + C$ C. $\cos^2 x + C$ D. $\frac{\sec^3 x}{3} + C$ E. $2 \sec^2 x \tan x + C$
11. If $\int_0^k (2kx - x^2) dx = 18$, then $k =$
 A. -9 B. -3 C. 3 D. 9 E. 18
13. $\int_0^1 (3x - 2)^2 dx =$
 A. $-\frac{7}{3}$ B. $-\frac{7}{9}$ C. $\frac{1}{9}$ D. 1 E. 3
15. What is the average value of y for the part of the curve $y = 3x - x^2$ which is in the first quadrant?
 A. -6 B. -2 C. $\frac{3}{2}$ D. $\frac{9}{4}$ E. $\frac{9}{2}$
16. The acceleration of a particle moving along the x -axis at time t is given by $a(t) = 6t - 2$. If the velocity is 25 when $t = 3$ and the position is 10 when $t = 1$, then the position $x(t) =$
 A. $9t^2 + 1$ B. $3t^2 - 2t + 4$ C. $t^3 - t^2 + 4t + 6$
 D. $t^3 - t^2 + 9t - 20$ E. $36t^3 - 4t^2 - 77t + 55$
17. $\int \frac{3x^2}{\sqrt{x^3 + 1}} dx =$
 A. $2\sqrt{x^3 + 1} + C$ B. $\frac{3}{2}\sqrt{x^3 + 1} + C$ C. $\sqrt{x^3 + 1} + C$
 D. $\ln\sqrt{x^3 + 1} + C$ E. $\ln(x^3 + 1) + C$

18. $\int (x^2 + 1)^2 dx =$

A. $\frac{(x^2 + 1)^3}{3} + C$ B. $\frac{(x^2 + 1)^3}{6x} + C$ C. $\left(\frac{x^3}{3} + x\right)^2 + C$

D. $\frac{2x(x^2 + 1)^3}{3} + C$ E. $\frac{x^5}{5} + \frac{2x^3}{3} + x + C$

20. $\int_1^2 (4x^3 - 6x) dx =$

A. 2 B. 4 C. 6 D. 36 E. 42

21. $\frac{1}{2} \int e^{t/2} dt$

A. $e^{-t} + C$ B. $e^{-t/2} + C$ C. $e^{t/2} + C$ D. $2e^{t/2} + C$ E. $e^t + C$

23. The average value of $\cos x$ on the interval $[-3, 5]$ is

A. $\frac{\sin 5 - \sin 3}{8}$ B. $\frac{\sin 5 - \sin 3}{2}$ C. $\frac{\sin 3 - \sin 5}{2}$

D. $\frac{\sin 3 + \sin 5}{2}$ E. $\frac{\sin 3 + \sin 5}{8}$

Calculator:

24. $\int_1^{500} (13^x - 11^x) dx + \int_2^{500} (11^x - 13^x) dx =$

A. 0.000 B. 14.946 C. 34.415 D. 46.000 E. 136.364

25. Which of the following are antiderivative of $f(x) = \sin x \cos x$?

I. $F(x) = \frac{\sin^2 x}{2}$ II. $F(x) = \frac{\cos^2 x}{2}$ III. $F(x) = \frac{-\cos(2x)}{4}$

A. I only B. II only C. III only D. I and III only E. II and III only

26. Let $F(x)$ be an antiderivative of $\frac{(\ln x)^3}{x}$. If $F(1) = 0$, then $F(9) =$

A. 0.048 B. 0.144 C. 5.827 D. 23.308 E. 1,640.250

Answers:

1. C 2.E 3.E 4. A 5.D 6. A 7. --- 8. A 9. A 10. ---
 11.C 12. --- 13.D 14. --- 15. C 16. C 17.A 18. E 19. --- 20. C
 21.C 22. --- 23.E 24.B 25.D 26.C