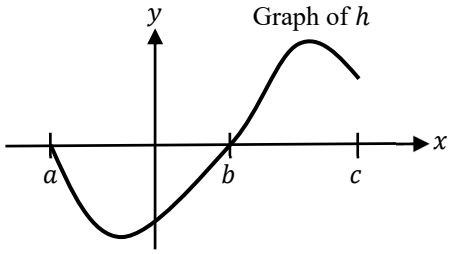
Name: _____ Date:_____

Corrective Assignment

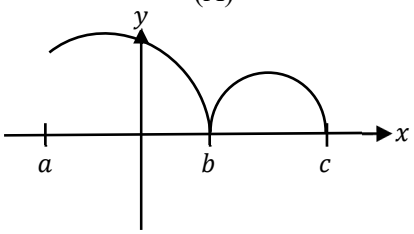
End of Unit 6 CA – Integration and Accumulation of Change

1. Let $f(x) = \int_a^x h(t)\,dt$, where h has the graph shown below.

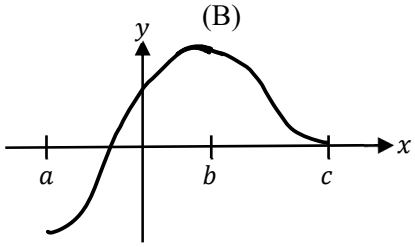


Which of the following could be the graph of f?

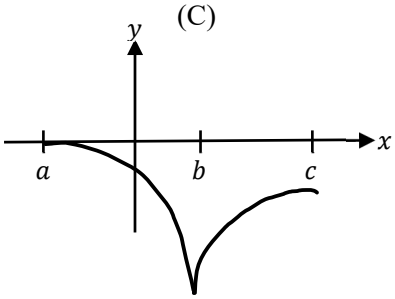
(A)



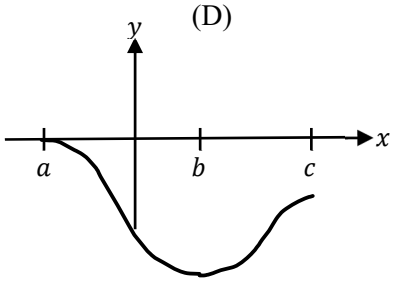
(B)



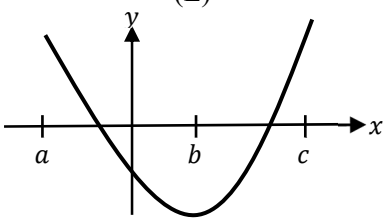
(C)



(D)



(E)



2. Let f and g be continuous functions such that $\int_0^{10} f(x)\,dx = 21$, $\int_0^{10} \frac{1}{2} g(x)\,dx = 8$, and $\int_3^{10} \big(f(x) - g(x)\big)\,dx = 2$. What is the value of $\int_0^3 \big(f(x) - g(x)\big)\,dx$?

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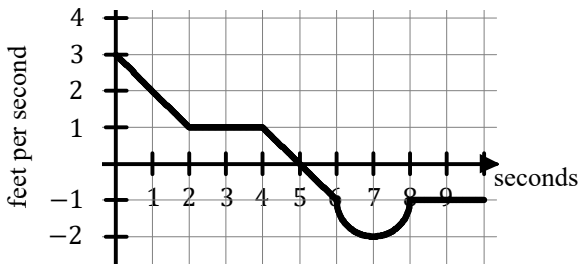
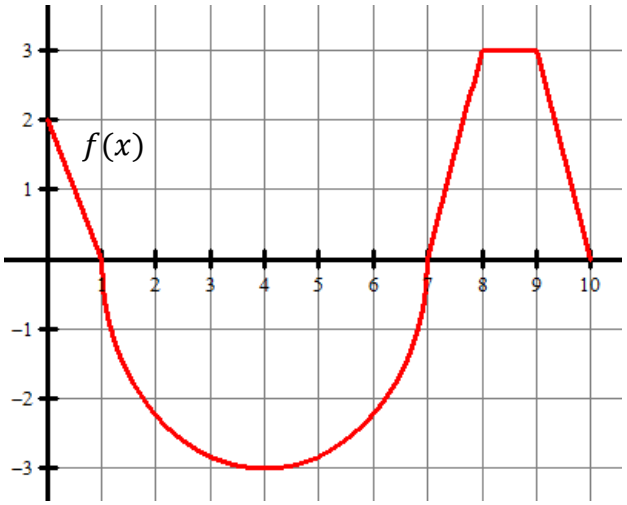
3. The graph below shows the velocity of a particle moving along the y-axis, measured in feet per second.



How far is the particle from its starting position after 10 seconds?

4.



(a) $\int_0^1 2f(x)dx =$

(b) $\int_1^7 f(x)dx =$

(c) $\int_0^7 f(x)dx =$

(d) $\int_{10}^7 f(x)dx =$

(e) $\int_8^8 f(x)dx =$

(f) $\int_0^{10} f(x)dx =$

Find the value of the definite integral.

5. $\int_2^3 \left(\frac{1}{x^2} + 4x^3\right) dx$

6. $\int_{-1}^8 x^{2/3}\ dx$

7. $\int_0^1 x\sqrt{1-x^2}\ dx$

8. $\int_{-1}^0 \frac{x}{x^2+1} dx$

9. $\int_0^1 \frac{y^2+2y}{\sqrt[3]{y^3+3y^2+4}} dy$

10. If $\int_4^{-10} g(x)\,dx = -3$ and $\int_4^6 g(x)\,dx = -2$, find $\int_{-10}^6 g(x)\,dx =$

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11. $\int_0^{e-1} \frac{4}{x+1}\,dx$

(A) 4 (B) $4e$ (C) 0 (D) $-4e$ (E) -4

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12. $\int \sin(2x)\cos(2x)\,dx$

(A) $\frac{1}{2}\sin^2(2x) + C$ (B) $-\frac{1}{2}\cos^2(2x) + C$ (C) $\frac{1}{4}\sin^2(2x) + C$

(D) $\frac{1}{4}\cos^2(2x) + C$ (E) $\frac{1}{2}\sin^2(2x)\cos(2x) + C$

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13. **Calculator active problem.** The table below contains values of a continuous increasing function *f* at several values of *x*.

x	1	3	7	10	12	15
$f(x)$	0.14	0.21	0.28	0.36	0.44	0.54

a. Use a left endpoint Riemann sum with three subintervals to approximate $\int_3^{12} f(x)dx$.

b. Is your approximation an overestimate or underestimate of the true value? Explain why.

Find the following indefinite integrals.

14. $\int \left(\frac{8x^2+3x-6}{x}\right) dx$

15. $\int \frac{1}{x\sqrt{x}} dx$

16. $\int \sec^2 x \, dx$

17. $\int \frac{e^{2x}}{e^{2x}+1} dx$

18. $\int \frac{x^3-\sqrt{x}}{\sqrt{x}} dx$

19. $\int x^3 \cos(x^4) \, dx$

20. $\int \frac{14x^2-29x-69}{2x-7} dx$

21. $\int \frac{1}{\sqrt{-x^2+6x-8}} dx$

22. If $f'(x) = 8x^3 + 1$ and $f(1) = 5$, then $f(2) =$

23. **Calculator active problem.** If $f'(x) = e^{\cos x}$ and $f(-1) = 3.31$, then $f(0) =$

Answers

1. D	2. 3	3. $2 - \frac{\pi}{2}$	4a. 2 4b. $-\frac{9\pi}{2}$ 4c. $1 - \frac{9\pi}{2}$	4d. -6 4e. 0 4f. $7 - \frac{9\pi}{2}$	
5. $65\frac{1}{6} = \frac{391}{6}$	6. $\frac{99}{5}$	7. $\frac{1}{3}$	8. $\ln\left(\frac{1}{\sqrt{2}}\right)$	9. $2 - \frac{1}{2}\sqrt[3]{16}$	10. 1
11. 4	12. C	13. 2.4	13b. Underestimate because it is a Left Riemann Sum with an increasing function.		
14. $4x^2 + 3x - 6\ln\|x\| + C$	15. $-\frac{2}{\sqrt{x}} + C$	16. $\tan x + C$			
17. $\frac{1}{2}\ln\|e^{2x} + 1\| + C$	18. $\frac{2}{7}x^{\frac{7}{2}} - x + C$	19. $\frac{1}{4}\sin(x^4) + C$			
20. $\frac{7}{2}x^2 + 10x + \frac{1}{2}\ln\|2x - 7\| + C$	21. $\sin^{-1}(x - 3) + C$	22. 35	23. 5.6515		