

# Classroom Voting Questions: Calculus II

## Section 6.2 Constructing Antiderivatives Analytically

1. **True or False:** If  $f$  is continuous on the interval  $[a, b]$ , then  $\int_a^b f(x)dx$  is a number (rather than a function).
  - (a) True, and I am very confident
  - (b) True, but I am not very confident
  - (c) False, but I am not very confident
  - (d) False, and I am very confident
  
2.  $\int (x^3 + 5)dx =$ 
  - (a)  $3x^2$
  - (b)  $3x^2 + 5$
  - (c)  $\frac{x^4}{4} + 5$
  - (d)  $\frac{1}{4}x^4 + 5x$
  - (e) None of the above
  
3.  $\int \sin x dx =$ 
  - (a)  $\sin x + C$
  - (b)  $\cos x + C$
  - (c)  $-\sin x + C$
  - (d)  $-\cos x + C$
  - (e) None of the above
  
4.  $\int x \sin x dx =$ 
  - (a)  $\cos x + C$
  - (b)  $\frac{1}{2}x^2(-\cos x) + C$
  - (c)  $x \cos x + C$
  - (d)  $\frac{1}{2}x^2 \sin x + C$
  - (e) Cant do with what we know right now

5.  $\int 5e^x dx =$

- (a)  $5e^x + C$
- (b)  $e^x + C$
- (c)  $5xe^x + C$
- (d)  $\frac{5e^{x+1}}{x+1} + C$
- (e) None of the above

6.  $\int \sqrt{x} dx =$

- (a)  $\frac{1}{2}x^{-1/2} + C$
- (b)  $\frac{2}{3}x^{3/2} + C$
- (c)  $\frac{3}{2}x^{3/2} + C$
- (d)  $\frac{3}{2}x^{2/3} + C$
- (e) Can't do with what we know right now

7.  $\int \sqrt{x^3} dx =$

- (a)  $x^{3/2} + C$
- (b)  $\frac{5}{2}x^{5/2} + C$
- (c)  $\frac{3}{2}x^{1/2} + C$
- (d)  $\frac{2}{5}x^{5/2} + C$
- (e)  $\frac{3}{5}x^{5/3} + C$
- (f) None of the above

8.  $\int \frac{7}{x^5} dx =$

- (a)  $-\frac{7}{4}x^{-4} + C$
- (b)  $7x^{-5} + C$
- (c)  $-\frac{7}{6x^6} + C$
- (d)  $\frac{7}{4x^4} + C$
- (e) None of the above

9. What is  $\int_1^5 3 dt$ ?

- (a) 3

- (b) 4
- (c) 12
- (d) 15
- (e) 16

10. What is  $\int \frac{5}{x^2} dx$ ?

- (a)  $-\frac{5}{x} + C$
- (b)  $\frac{5}{x^2} + C$
- (c)  $-\frac{10}{x^3} + C$
- (d)  $\frac{30}{x^4} + C$

11.  $\int \frac{3}{x} dx =$

- (a)  $-\frac{3}{2}x^{-2} + C$
- (b)  $3 \ln x + C$
- (c)  $\frac{3}{x^2} + C$
- (d)  $3x^{-1} + C$
- (e) None of the above

12. An antiderivative of  $6x^2$  is

- (a)  $2x^3$
- (b)  $2x^3 + 5$
- (c)  $2x^3 + 18$
- (d)  $2x^3 - 6$
- (e) All of the above

13. Which of the following is an antiderivative of  $y(x) = 3 \sin(x) + 7$ ?

- (a)  $g(x) = 3 \cos(x)$
- (b)  $g(x) = 3 \cos(x) + 7$
- (c)  $g(x) = 3 \cos(x) + 7x$
- (d)  $g(x) = -3 \cos(x) + 7x$

14. **True or False:** If  $F(x)$  is an antiderivative of  $f(x)$  and  $G(x) = F(x) + 2$ , then  $G(x)$  is an antiderivative of  $f(x)$ .
- (a) True, and I am very confident
  - (b) True, but I am not very confident
  - (c) False, but I am not very confident
  - (d) False, and I am very confident
15. Water is flowing out of a reservoir at a rate given by  $f(t) = 5000 + 50t + 5t^2$ , where  $t$  is in days and  $f$  is in gallons per day. How much water flows out of the reservoir during the first week?
- (a) 572 gallons
  - (b) 5,000 gallons
  - (c) 5,595 gallons
  - (d) 35,000 gallons
  - (e) 36,797 gallons
  - (f) None of the above
16. Trucks are driving over a bridge at a rate given by the function  $b(t) = 30 \cos(t) + 70$ , where  $t$  is in hours from noon and  $b$  is in trucks per hour. How many trucks drive across the bridge between 3pm and 6pm?
- (a) 13 trucks
  - (b) 210 trucks
  - (c) 197 trucks
  - (d) 269 trucks
17. We know that  $\frac{dy}{dx} = x^2$  and that  $x(1) = 4$ . What is the function  $y(x)$ ?
- (a)  $y = \frac{1}{3}x^3$
  - (b)  $y = \frac{1}{3}x^3 + 3\frac{2}{3}$
  - (c)  $y = \frac{1}{3}x^3 + 4$
  - (d)  $y = x^2 + 3$
  - (e) None of the above