

Classroom Voting Questions: Calculus II

Section 7.1 Integration by Substitution

1. **True or False:** $\int 2xe^{x^2} dx = e^{x^2} + C$.
 - (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. If we are trying to evaluate the integral $\int e^{\cos \theta} \sin \theta d\theta$, which substitution would be most helpful?
 - (a) $u = \cos \theta$
 - (b) $u = \sin \theta$
 - (c) $u = e^{\cos \theta}$

3. If we are trying to evaluate the integral $\int x^2 \sqrt{x^3 + 5} dx$, which substitution would be most helpful?
 - (a) $u = x^2$
 - (b) $u = x^3$
 - (c) $u = x^3 + 5$
 - (d) $u = \sqrt{x^3 + 5}$

4. Would a substitution be useful in evaluating this integral? $\int x \sin(x^2) dx$
 - (a) Yes, I think substitution would be useful, and I am very confident.
 - (b) Yes, I think substitution would be useful, but I am not very confident.
 - (c) No, I think substitution would not be useful, but I am not very confident.
 - (d) No, I think substitution would not be useful, and I am very confident.

5. Would a substitution be useful in evaluating this integral? $\int x \sin x dx$
 - (a) Yes, I think substitution would be useful, and I am very confident.

- (b) Yes, I think substitution would be useful, but I am not very confident.
(c) No, I think substitution would not be useful, but I am not very confident.
(d) No, I think substitution would not be useful, and I am very confident.
6. Would a substitution be useful in evaluating this integral? $\int (3x + 2)(x^3 + 5x)^7 dx$
- (a) Yes, I think substitution would be useful, and I am very confident.
(b) Yes, I think substitution would be useful, but I am not very confident.
(c) No, I think substitution would not be useful, but I am not very confident.
(d) No, I think substitution would not be useful, and I am very confident.
7. Would a substitution be useful in evaluating this integral? $\int \frac{1}{x \ln x} dx$
- (a) Yes, I think substitution would be useful, and I am very confident.
(b) Yes, I think substitution would be useful, but I am not very confident.
(c) No, I think substitution would not be useful, but I am not very confident.
(d) No, I think substitution would not be useful, and I am very confident.
8. Would a substitution be useful in evaluating this integral? $\int e^{\sin \theta} \cos \theta d\theta$
- (a) Yes, I think substitution would be useful, and I am very confident.
(b) Yes, I think substitution would be useful, but I am not very confident.
(c) No, I think substitution would not be useful, but I am not very confident.
(d) No, I think substitution would not be useful, and I am very confident.
9. Would a substitution be useful in evaluating this integral? $\int e^x \sqrt{1 + e^x} dx$
- (a) Yes, I think substitution would be useful, and I am very confident.
(b) Yes, I think substitution would be useful, but I am not very confident.
(c) No, I think substitution would not be useful, but I am not very confident.
(d) No, I think substitution would not be useful, and I am very confident.
10. Would a substitution be useful in evaluating this integral? $\int \frac{\sin x}{x} dx$
- (a) Yes, I think substitution would be useful, and I am very confident.
(b) Yes, I think substitution would be useful, but I am not very confident.

- (c) No, I think substitution would not be useful, but I am not very confident.
- (d) No, I think substitution would not be useful, and I am very confident.

11. Would a substitution be useful in evaluating this integral? $\int \frac{e^x - e^{-x}}{(e^x + e^{-x})^3} dx$

- (a) Yes, I think substitution would be useful, and I am very confident.
- (b) Yes, I think substitution would be useful, but I am not very confident.
- (c) No, I think substitution would not be useful, but I am not very confident.
- (d) No, I think substitution would not be useful, and I am very confident.

12. Would a substitution be useful in evaluating this integral? $\int x^{16}(x^{17} + 16x)^{16} dx$

- (a) Yes, I think substitution would be useful, and I am very confident.
- (b) Yes, I think substitution would be useful, but I am not very confident.
- (c) No, I think substitution would not be useful, but I am not very confident.
- (d) No, I think substitution would not be useful, and I am very confident.

13. What is $\int_0^{1/2} \cos(\pi x) dx$?

- (a) 0
- (b) π
- (c) $1/\pi$
- (d) 1
- (e) This integral cannot be done with substitution.

14. A company's sales are growing at an exponential rate, so that the sales rate is $R = R_0 e^{0.2t}$ widgets per year, where t is in years, starting now. Right now the company is selling widgets at a rate of 1000 widgets per year. If this model holds, how many widgets will they sell over the next ten years?

- (a) 1,278
- (b) 6,389
- (c) 7,389
- (d) 31,945
- (e) 32,945
- (f) 36,945

15. What is $\int \frac{1}{\sqrt{4-x}} dx$?

- (a) $\frac{1}{2}(4-x)^{-3/2} + C$
- (b) $2\sqrt{4-x} + C$
- (c) $-2\sqrt{4-x} + C$
- (d) $-\frac{2}{3}(4-x)^{3/2} + C$
- (e) This integral cannot be done with substitution.

16. What is $\int \frac{1}{5x} dx$?

- (a) $\ln(5x) + C$
- (b) $\frac{1}{5} \ln x + C$
- (c) $\frac{1}{5} \ln(5x) + C$
- (d) This integral cannot be done with substitution.

17. What is $\int xe^{x^2} dx$?

- (a) $-\frac{1}{2}e^u + C$
- (b) $-\frac{1}{2}e^{-x^2} + C$
- (c) $-2e^{-x^2} + C$
- (d) $e^{-x^2} - 4x^2e^{-x^2} + C$
- (e) This integral cannot be done with substitution.

18. What is $\int \cos x \sin^6 x dx$?

- (a) $\frac{1}{7}x^7 + C$
- (b) $\frac{1}{7} \sin^7 x + C$
- (c) $\frac{1}{7} \cos^7 x + C$
- (d) This integral cannot be done with substitution.

19. What is $\int \cos x \sin x dx$?

- (a) $\frac{1}{2} \sin^2 x + C$
- (b) $-\frac{1}{2} \cos^2 x + C$
- (c) $\frac{1}{2} \sin^2 x \cos^2 x + C$
- (d) This integral cannot be done with substitution.

20. What is $\int \frac{\sin x}{\cos x} dx$?

- (a) $-\ln(\cos x) + C$
- (b) $\ln(\sin x) + C$
- (c) $-\ln\left(\frac{\sin x}{\cos x}\right) + C$
- (d) $\ln(\cos x) + C$
- (e) This integral cannot be done with substitution.

21. $\int \tan x dx =$

- (a) $\sec^2 x + C$
- (b) $\ln|\cos x| + C$
- (c) $\ln|\sec x| + C$
- (d) $\ln|\sec x + \tan x| + C$

22. $\int \tan^2 x dx =$

- (a) $\tan x - x + C$
- (b) $\sec^2 x + C$
- (c) $\sec x \tan x + C$
- (d) $\sec x + C$