

# Classroom Voting Questions: Calculus II

## Section 7.1 Integration by Substitution

1. 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)  $u = e^{\cos \theta}$
  
2. 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)  $u = \sqrt{x^3 + 5}$
  
3. Would a substitution be useful in evaluating this integral?  $\int x \sin(x^2) dx$ 
  - (a) Yes, substitution would be useful.
  - (b) No, substitution would not be useful.
  
4. Would a substitution be useful in evaluating this integral?  $\int x \sin x dx$ 
  - (a) Yes, substitution would be useful.
  - (b) No, substitution would not be useful.
  
5. Would a substitution be useful in evaluating this integral?  $\int (3x + 2)(x^3 + 5x)^7 dx$ 
  - (a) Yes, substitution would be useful.
  - (b) No, substitution would not be useful.
  
6. Would a substitution be useful in evaluating this integral?  $\int \frac{1}{x \ln x} dx$

- (a) Yes, substitution would be useful.  
(b) No, substitution would not be useful.
7. Would a substitution be useful in evaluating this integral?  $\int e^{\sin \theta} \cos \theta d\theta$
- (a) Yes, substitution would be useful.  
(b) No, substitution would not be useful.
8. Would a substitution be useful in evaluating this integral?  $\int e^x \sqrt{1 + e^x} dx$
- (a) Yes, substitution would be useful.  
(b) No, substitution would not be useful.
9. Would a substitution be useful in evaluating this integral?  $\int \frac{\sin x}{x} dx$
- (a) Yes, substitution would be useful.  
(b) No, substitution would not be useful.
10. Would a substitution be useful in evaluating this integral?  $\int \frac{e^x - e^{-x}}{(e^x + e^{-x})^3} dx$
- (a) Yes, substitution would be useful.  
(b) No, substitution would not be useful.
11. Would a substitution be useful in evaluating this integral?  $\int x^{16} (x^{17} + 16x)^{16} dx$
- (a) Yes, substitution would be useful.  
(b) No, substitution would not be useful.
12. What is  $\int_0^{1/2} \cos(\pi x) dx$ ?
- (a) 0  
(b)  $\pi$   
(c)  $1/\pi$   
(d) 1  
(e) This integral cannot be done with substitution.

13. 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

14. 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.

15. 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.

16. What is  $\int x e^{x^2} dx$ ?

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

17. 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.

18. 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.

19. 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.