Classroom Voting Questions: Calculus II

Section 7.2 Integration by Parts

1. What is the derivative of \( f(x) = \frac{1}{3}xe^{3x} - \frac{1}{9}e^{3x} + 25? \)
   
   (a) \( f'(x) = xe^{3x} \)
   (b) \( f'(x) = \frac{2}{3}e^{3x} \)
   (c) \( f'(x) = \frac{1}{3}e^{3x} + xe^{3x} \)
   (d) \( f'(x) = e^{3x} \)

2. What is \( \int xe^{4x}dx \)?
   
   (a) \( \frac{1}{8}x^2e^{4x} + C \)
   (b) \( \frac{1}{4}xe^{4x} - \frac{1}{16}e^{4x} + C \)
   (c) \( \frac{1}{4}xe^{4x} - \frac{1}{4}e^{4x} + C \)
   (d) \( \frac{1}{16}e^{4x} - \frac{1}{4}xe^{4x} + C \)

3. Find \( \int_1^4 \ln(t)\sqrt{t}dt \).
   
   (a) 4.28
   (b) 3.83
   (c) -1
   (d) 0.444
   (e) 5.33
   (f) This integral cannot be done with integration by parts.

4. Estimate \( \int_0^5 f(x)g'(x)dx \) if \( f(x) = 2x \) and \( g(x) \) is given in the figure below.

![Graph of g(x)]
(a) \( \approx 40 \)
(b) \( \approx 20 \)
(c) \( \approx 10 \)
(d) \( \approx -10 \)
(e) This integral cannot be done with integration by parts.

5. Find an antiderivative of \( x^2e^x \).

(a) \( x^2e^x - 2xe^x + 2e^x \)
(b) \( x^2e^x - 2xe^x \)
(c) \( \frac{1}{3}x^3e^x - x^2e^x + 2e^x \)
(d) \( x^2e^x - 2xe^x - 2e^x \)
(e) This integral cannot be done with integration by parts.

6. How many applications of integration by parts are required to evaluate \( \int x^3e^x \, dx \)?

(a) 1
(b) 2
(c) 3
(d) The integral cannot be evaluated using integration by parts.

7. \( \int x \cos 2x \, dx = \)

(a) \( x \sin 2x + \frac{1}{2} \cos 2x \)
(b) \( \frac{1}{2}x \sin 2x + \frac{1}{4} \cos 2x \)
(c) \( \frac{1}{2}x \sin 2x - \frac{1}{4} \cos 2x \)
(d) None of the above