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Math_Questions_0048

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1. Discuss integration by substitution with a detailed example.
2. Discuss consumer's surplus and producer's surplus in context to the area between the demand and supply curve; give an example with detailed computations of calculations of consumer's surplus and producer's surplus.
3. How can you measure 1 gallon of juice out of a barrel, if all you have available is a 3-gallon and a 5-gallon pitcher?

**Find the indicated intergral and check your answers by differentiation.
Each question is equally weighted.**

4. $\int dx$

5. $\int 3e^x dx$

6. $\int x(2x+1)^2 dx$

7. $\int_{\sqrt{x}}^{e\sqrt{x}} dx$

8. Depreciation . The resale value of a certain industrial machine decreases at a rate that depends on its age. When the machine is t years old, the rate at which its value is changing is $-960e^{-t/5}$ dollars per year.
 - (a) Express the value of the machine in terms of its age and initial value.
 - (b) If the machine was originally worth \$5,200, how much will it be worth when it is 10 years old?