

8. Use Part 1 of the Fundamental Theorem of Calculus to find the derivative of

$$F(x) = \int_2^x t\sqrt{1-t^5} dt.$$

$$F'(x) = x\sqrt{1-x^5}$$

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| 11 pts |
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9. Find the general indefinite integral  $\int \frac{\sin(x)}{\cos^2(x)} dx$ .

$$= \int \frac{\sin x}{\cos x} \frac{1}{\cos x} dx$$

$$= \int \tan x \sec x dx$$

$$= \sec x + C$$

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| 11 pts |
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10. If  $f$  is continuous, and  $\int_0^8 f(x) dx = 4$ , find  $\int_0^2 x^2 f(x^3) dx$ . State clearly your substitutions.

$$u = x^3$$

$$du = 3x^2 dx$$

$$x^2 dx = \frac{1}{3} du$$

$$x = 0 \rightarrow u = 0$$

$$x = 2 \rightarrow u = 8$$

$$\int_0^2 x^2 f(x^3) dx = \frac{1}{3} \int_0^8 f(u) du = \frac{4}{3}$$

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| 11 pts |
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