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Instructions: Though calculators can be used for all the questions, all problems require you to show your work. Any answer without proper justification will receive **ZERO** credit. Only **EXACT** answers will receive full credit unless otherwise noted.

1. Determine the *general* antiderivative of  $f(x) = 9x^5 + \sin(8x) - e^{3x}$

$$F(x) = \frac{3}{2}x^6 - \frac{1}{8}\cos(8x) - \frac{1}{3}e^{3x} + C$$

$$\frac{1}{2}x^5 + \sin(8x) - e^{3x}$$

$$9x^5 + \sin(8x) - e^{3x}$$

2. Determine  $\int (\sec^2 x + 11x^5 + 7) dx$

$$F(x) = \int (\sec^2 x) dx + \int (11x^5) dx + \int 7 dx$$

$$F(x) = \tan x + \frac{11}{6}x^6 + 7x + C$$

$$\sec^2 x + 11x^5 + 7$$

3. Determine the function whose slope at  $(x, y)$  is  $-5x^3 + 6x$  and passes through  $(-2, 7)$ .

$$-5x^3 + 6x$$

$$S(x) = -5x^3 + 6x \quad F(x) = -\frac{5}{4}x^4 + 3x^2 + 15$$

$$F(x) = -\frac{5}{4}x^4 + 3x^2 + C$$

$$7 = -\frac{5}{4}(-2)^4 + 3(-2)^2 + C$$

$$7 = -20 + 12 + C$$

$$7 = -8 + C$$

$$15 = C$$