

Name _____

Justify all answers by showing your work or by providing a coherent explanation. Please circle your answers.

1. $\int \frac{8}{x^2 - 3x - 10} dx = \frac{8}{7} \ln(x - 5) - \frac{8}{7} \ln(x + 2) + C$

2. $\int \sin^2 3x dx = \frac{1}{2}x - \frac{1}{12} \sin 6x + C$

3. $\int \sqrt{x^2 + 4} dx = \frac{1}{2}x\sqrt{x^2 + 4} + 2 \ln(x + \sqrt{x^2 + 4}) + C$

4. $\int x \sec^2 3x dx = \frac{1}{3} \tan 3x - \frac{1}{9} \ln |\sec 3x| + C$

$$5. \int \frac{x^4}{(1-x)^3} dx = -\frac{1}{2}x^2 - 3x - 6\ln(1-x) - \frac{4}{1-x} + \frac{1}{2(1-x)^2} + C$$

$$6. \int \frac{e^{\sqrt{x}}}{\sqrt{x}} dx = 2e^{\sqrt{x}} + C$$

$$7. \int_{x=2}^{x=4} \frac{dx}{9-x^2} = \frac{1}{2} \int \sec \theta d\theta = \frac{1}{2} \ln(\sec \theta + \tan \theta) = \frac{1}{2} \ln \left(\frac{3+x}{\sqrt{9-x^2}} \right) \Bigg|_2^4 \dots \text{ Oh Oh !}$$

$$8. \text{ Find } y(x) \text{ in } \frac{dy}{dx} = 3x^2 e^{-y}$$