NAME _____

PROBLEMS FOR 6.1 AND THE INVERSE CHAIN RULE (25 points) SHOW AND ATTACH ALL WORK and give **EXACT ANSWERS**. Make an appropriate sketch, set up one or more appropriate definite integral, and then show the correct integration. Use a graphing calculator to verify your answer(if you wish). Problems 1,2, and 3 are worth 5 points each, 4-8 are worth 2 points each.

1. Find the area of the region between $x = y^2 - 4y$ and $x + 2y = 24$.

2. Find the area of the region(s) (draw this very carefully, there are several regions as the curves cross over one another, luckily at "special angle" values for *x*) enclosed between the curves: $y = \cos 2x$ and $y = 1 + \sin x$ from $x = \pi$ to $x = 2\pi$.

3. Use integration to find the area of the triangle whose vertices are $(-5,2), (3,-6),$ and $(5,7)$. (1 point of extra credit for a substantially different solution providing verification of this area using old concepts from geometry or analytic geometry—this should NOT be a calculator solution and should produce the same EXACT answer)

4. Evaluate: $\int_{\sqrt{5}}^{2\sqrt{11}} \frac{5x}{\sqrt[3]{7-3x^2}}\,dx$. Why is this answer negative?

5. Evaluate: $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \tan^3 x \sec^2 x\,dx$

6. Evaluate: $\int_{-6}^{0} 3x^2\sqrt{9-x^3}\,dx$

7. Evaluate: $\int \frac{\left(4\sqrt[5]{x}+7\right)^3}{\sqrt[5]{x^4}}\,dx$

8. Evaluate: $\int_{4}^{9} \frac{1}{\sqrt{x}\left(\sqrt{x}-1\right)^7}\,dx$