

Directions: Show all work on a separate sheet of paper for full credit.

1. Set up an integral for the area of the surface obtained by rotating the curve around (i) the  $x$ -axis and (ii) the  $y$ -axis.

(a)  $y = \tan(x)$ ,  $0 \leq x \leq \pi/3$

(b)  $y = e^{-x^2}$ ,  $-1 \leq x \leq 1$

(c)  $x = \ln(2y + 1)$ ,  $0 \leq y \leq 1$

(d)  $y = \tan^{-1}(x)$ ,  $0 \leq x \leq 2$

2. Find the exact area of the surface obtained by rotating the curve around the given axis.

(a)  $y = x^3$ ,  $0 \leq x \leq 2$ , around the  $x$ -axis.

(b)  $y = \frac{1}{3}x^{3/2}$ ,  $0 \leq x \leq 12$ , around the  $y$ -axis.