

1. The arc of a parabola $y^2 = x$ from (1,1) to (4,2) is revolved about the x-axis. Find the area of the resulting surface?

ANSWER $\pi(17^{3/2} - 5^{3/2})/6$

SOLUTION $\int_1^4 2\pi x^{1/2} \sqrt{1 + \frac{1}{2x^{1/2}}} dx = \pi \int_1^4 \sqrt{4x + 1} dx$

2. If f and g are inverse functions and $f(x) = e^{2x} + 2e^x + 1$, where $x \geq 0$, find the slope of the tangent line to the graph of $g(x)$ at (4,0).

ANSWER $1/4$

SOLUTION $f' = 2e^{2x} + 2e^x$ and $f'(0) = 4$ and $g'(4) = 1/4$

3. What is the base b when 554 in base b is the square of 24 in base b ?

ANSWER 12

SOLUTION $5b^2 + 5b + 4 = (2b + 4)^2$ and $b^2 - 11b - 12 = 0 = (b - 12)(b + 1)$