Integrating Absolute Value and FTC Practice

Name: _____

Evaluate the given integral

1. $\int_0^2 |2x-1|dx$

2. $\int_0^{\frac{3\pi}{2}} |\sin x|dx$

3. $\int_0^4 |x^2-2|dx$

4. $\int_0^2 |x-\sqrt{x}|dx$

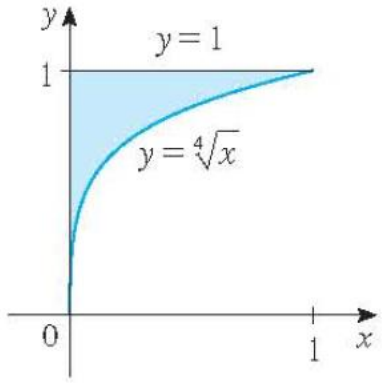
5. $\int_1^4 \frac{\sqrt{y}-y}{y^2}dy$

6. $\int_0^{\frac{\pi}{3}} \frac{\sin\theta+\sin\theta\tan^2\theta}{\sec^2\theta}\,d\theta$

7. $\int_0^2 (2x-3)(4x^2+1)dx$

8. $\int_{-1}^1 t(1-t)^2\,dt$

9. The boundaries of the shaded region are the y-axis, the line $y = 1$, and the curve $y = \sqrt[4]{x}$. Find the area of this region by writing x as a function of y and integrating with respect to y.



10. The current in a wire is defined as the derivative of the charge: $I(t) = Q'(t)$. What does $\int_a^b I(t)dt$ represent?

11. The acceleration of a particle moving along a line is given by $a(t) = 2t + 3$, in m/s^2 with initial velocity $t = -4$. Find the velocity, and the distance traveled $0 \leq t \leq 3$.

12. Water flows into and out of a storage tank. A graph of the rate of change $r(t)$ of the volume of water in the tank, in liters per day, is shown. If the amount of water in the tank at time $t = 0$ is 25,000 L, use the Midpoint Rule to estimate the amount of water in the tank four days later.