

This exam contains 20 multiple choice questions. Each question is worth 5 points.

1. Find the arc length of

$$y = \frac{x^3}{12} + \frac{1}{x}$$

over the interval $[1, 3]$. (Hint: Use the identity $1 + (y')^2 = (x^2/4 + x^{-2})^2$.)

- A) 8/13
- B) 13/12
- C) 7/9
- D) 5/12
- E) 2/5
- F) 13/6
- G) 17/6
- H) 15/12
- I) 5/6
- J) 17/12

2. Which of the following integrals correctly represents the surface area of revolution of $y = e^x$ about the x -axis over the interval $[0, 1]$?

- A) $\int_0^1 u\sqrt{1+u^2} du$
- B) $\int_0^1 \sqrt{1+u^2} du$
- C) $\pi \int_1^e u\sqrt{1+u^2} du$
- D) $\pi \int_1^e \sqrt{1+u^2} du$
- E) $2\pi \int_0^1 u\sqrt{1+u^2} du$
- F) $2\pi \int_0^1 \sqrt{1+u^2} du$
- G) $2\pi \int_1^e u\sqrt{1+u^2} du$
- H) $2\pi \int_1^e \sqrt{1+u^2} du$
- I) $\int_1^e u\sqrt{1+u^2} du$
- J) $\int_1^e \sqrt{1+u^2} du$

3. A thin triangular plate is submerged vertically in water so that one side is level with the water's surface. The plate is a right-triangle with two sides of length 1. Let w be the weight density of water. Calculate the force of the water on the surface of the plate.

- A) $w/6$
- B) $w/5$
- C) $w/4$
- D) $w/3$
- E) $w/2$
- F) w
- G) $2w/3$
- H) $2w/5$
- I) $2w/7$
- J) $3w/5$

