

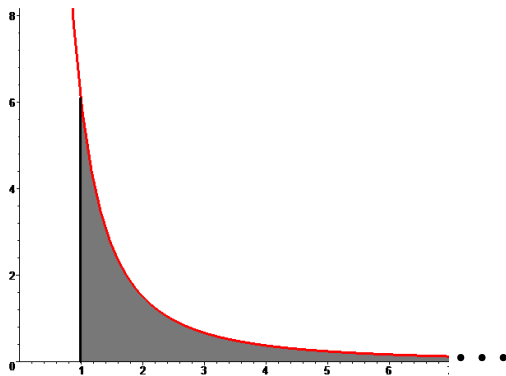
1. Evaluate the integral

$$\int_1^{\infty} \frac{\ln x}{x^{4/3}} dx$$

- (A) 4 (E) $\frac{4}{3}$
 (B) $\frac{4}{9}$ (F) 9
 (C) 2 (G) 1
 (D) $\frac{1}{2}$ (H) The integral diverges

2. Find the volume of the solid generated by revolving the region in the first quadrant under the curve

$y = \frac{10}{x^2}$ bounded on the left by $x = 1$, about the x -axis.



- (A) The integral diverges (E) $\frac{10\pi}{3}$
 (B) $\frac{25\pi}{2}$ (F) $\frac{50\pi}{3}$
 (C) $\frac{49\pi}{2}$ (G) $\frac{75\pi}{3}$
 (D) $\frac{75\pi}{4}$ (H) $\frac{100\pi}{3}$

3. Consider both integrals below. Show work by using one of the comparison theorems.

I. $\int_4^{\infty} \frac{2 + \cos x}{\sqrt[3]{x}} dx$

II. $\int_2^{\infty} \frac{x}{\sqrt{x^5 + 4}} dx$

- (A) Both (I) and (II) converge. (C) (I) converges and (II) diverges.
 (B) Both (I) and (II) diverge. (D) (I) diverges and (II) converges.

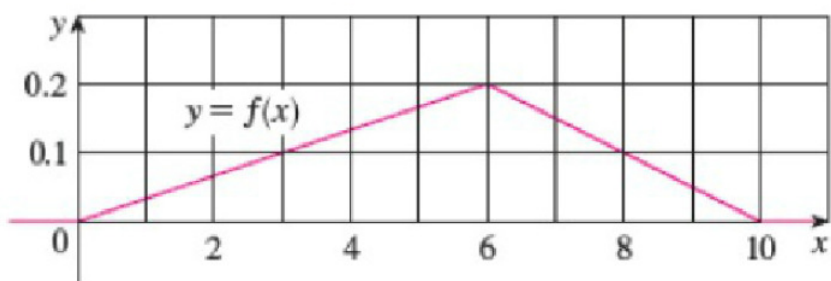
4. Let

$$f(x) = \begin{cases} 16xe^{-4x} & \text{if } x \geq 0 \\ 0 & \text{if } x < 0 \end{cases}$$

$f(x)$ is a probability density function. Find its mean.

- (A) $\frac{1}{2}$ (E) $\frac{2}{3}$
 (B) $\frac{1}{3}$ (F) $\frac{3}{4}$
 (C) $\frac{1}{4}$ (G) 1
 (D) $\frac{1}{8}$ (H) $\frac{3}{2}$

5. Consider the probability density function $f(x)$ whose graph is displayed below.



Find the probability that $3 \leq x \leq 8$.

- | | |
|--------------------|--------------------|
| (A) $\frac{3}{10}$ | (E) $\frac{1}{2}$ |
| (B) $\frac{2}{5}$ | (F) $\frac{4}{5}$ |
| (C) $\frac{1}{4}$ | (G) $\frac{7}{10}$ |
| (D) $\frac{3}{4}$ | (H) $\frac{4}{5}$ |

6. Solve the initial value problem

$$xy' - \ln x = 0 \quad \text{with } y(1) = \frac{7}{2}$$

Find
 $y(e)$.

- | | |
|-------------------|-------|
| (A) 0 | (E) 2 |
| (B) e | (F) 3 |
| (C) $\frac{1}{2}$ | (G) 4 |
| (D) 1 | (H) 5 |

7. Solve the initial value problem

$$xy' + \frac{1}{2}y = x^{3/2} \quad \text{with } y(1) = \frac{5}{2}$$

Find
 $y(4)$.

- | | |
|-------------------|-------|
| (A) 0 | (E) 2 |
| (B) e | (F) 3 |
| (C) $\frac{1}{2}$ | (G) 4 |
| (D) 1 | (H) 5 |

ANSWERS:

1. F 2. H 3. D 4. A 5. D 6. G 7. H