Multiple-Choice Test

Chapter 07.01
Background

1. Physically, integrating $\int_a^b f(x)dx$ means finding the

   (A) area under the curve from a to b
   (B) area to the left of point a
   (C) area to the right of point b
   (D) area above the curve from a to b

2. The mean value of a function $f(x)$ from a to b is given by

   (A) $\dfrac{f(a)+f(b)}{2}$

   (B) $\dfrac{f(a)+2f\left(\dfrac{a+b}{2}\right)+f(b)}{4}$

   (C) $\int_a^b f(x)dx$

   (D) $\dfrac{\int_a^b f(x)dx}{b-a}$

3. The exact value of $\int_{0.2}^{2.2} xe^x dx$ is most nearly

   (A) 7.8036
   (B) 11.807
   (C) 14.034
   (D) 19.611

4. $\int_{0.2}^{2} f(x)dx$ for

$$f(x) = x, \qquad 0 \le x \le 1.2$$
$$= x^2, \quad 1.2 < x \le 2.4$$

   is most nearly
   (A) 1.9800
   (B) 2.6640
   (C) 2.7907
   (D) 4.7520

5. The area of a circle of radius a can be found by the following integral

(A) $\int_0^a \left(a^2 - x^2\right)dx$

(B) $\int_0^{2\pi} \sqrt{a^2 - x^2}\,dx$

(C) $4\int_0^a \sqrt{a^2 - x^2}\,dx$

(D) $\int_0^a \sqrt{a^2 - x^2}\,dx$

6. Velocity distribution of a fluid flow through a pipe varies along the radius and is given by $v(r)$. The flow rate through the pipe of radius a is given by

(A) $\pi v(a) a^2$

(B) $\pi \dfrac{v(0) + v(a)}{2} a^2$

(C) $\int_0^a v(r)\,dr$

(D) $2\pi \int_0^a v(r)\,r\,dr$

Complete Solution