1500 Chapter 17 Improper Integrals & 18 Applications

Take: 1 | 07/17/16

Directions:
I would recommend that you do the following:

1) Complete all of the preparation a head of time. Get a printout of the test to take with paper and pencil .

3)

Description:
There are 21 multiple choice questions. You must complete and submit this test in Thinkwell BEFORE the deadline. Be sure to answer ALL questions. I would strongly recommend that you check as many questions as possible.

1) QID: 26136

Evaluate the integral $\int_0^2 \frac{dx}{\sqrt{2-x}}$.

- $-2\sqrt{2}$
- $\sqrt{2}$
- $-\sqrt{2}$
- $2\sqrt{2}$

2) QID: 19978

What is the correct way to evaluate the improper integral

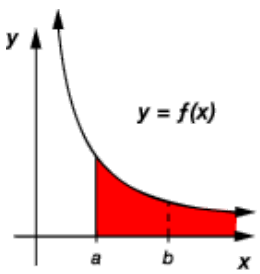
$$\int_{-4}^{4} \frac{1}{x^4}\,dx$$

using subintervals?

- $\int_{-4}^{0} \frac{1}{x^4}\,dx + \int_{0}^{4} \frac{1}{x^4}\,dx$
- $\int_{-4}^{-2} \frac{1}{x^4}\,dx + \int_{-2}^{0} \frac{1}{x^4}\,dx$
- $\int_{0}^{2} \frac{1}{x^4}\,dx + \int_{2}^{4} \frac{1}{x^4}\,dx$
- $\int_{-4}^{-2} \frac{1}{x^4}\,dx + \int_{-2}^{4} \frac{1}{x^4}\,dx$

3) QID: 19261

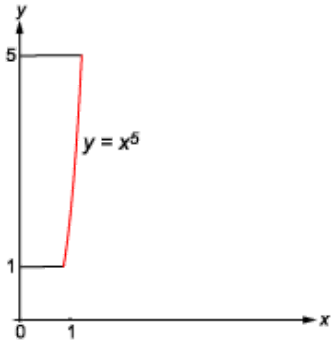
Consider the red region under the curve $y = f(x)$ where $x \to \infty$. Which of the following expressions correctly describes the limit of the area of the red region?



- $\lim_{x \to \infty} f(x)$
- $\int_a^b f(x)\,dx$
- $\lim_{b \to \infty} \int_a^b f(x)\,dx$
- $\int_{-\infty}^{\infty} f(x)\,dx$

4) QID: 18559

Set up the integral that produces the volume of the solid generated by revolving the plane region bounded by $y = x^5$, $y = 1$, $y = 5$, and $x = 0$ about the y-axis.



- $\int_1^5 y^{2/5}\,dy$
- $\int_1^5 \pi y^{1/5}\,dy$
- $\int_1^5 \pi y^{10}\,dy$
- $\int_1^5 \pi y^{2/5}\,dy$

5) QID: 18589

Consider the solid of revolution generated by rotating the area bounded by $y = \sqrt{\cos x}$, the x-axis, $x = 0$ and $x = \pi/2$ around the x-axis. What will be the upper limit of integration in the formula to determine the volume using disks?

- 0
- 1
- $\frac{\pi}{2}$
- π

6) QID: 18708

What is the volume of the solid of revolution generated by revolving the area bounded by $y = 2$, $y = x$, and $x = 0$ around the $x-$axis?

- 8π units^3
- $\frac{16\pi}{3}$ units^3
- 2π units^3
- $\frac{-8\pi}{3}$ units^3

7) QID: 18714

It takes 10 lb of force to stretch a spring 2 in. What is the stiffness (spring constant) of the spring?

- 5 lb/in
- 5 lb-in
- 5 in/ft
- 5 in/lb

8) QID: 18725

Which of the following is the work done by a constant force F moving an object along a straight line from a to b?

- $W = F \cdot (a + b)$
- $W = F \cdot (a - b)$
- $W = \frac{F}{b - a}$
- $W = F \cdot (b - a)$

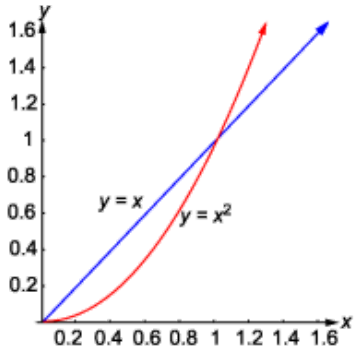
9) QID: 18796

A crane raises a 12,000 N marble sculpture at a constant velocity onto a pedestal 1.5 m above the ground outside an art museum. How much work is done by the crane?

- 180,000 N-m
- 18,000 N-m
- 18,000
- 12,000 N-m

10) QID: 18812

Consider a region bounded by curves $y = x$ and $y = x^2$ rotated about the x−axis. What is the volume of the resulting solid?



- $\frac{\pi}{6}$
- $\frac{4\pi}{15}$
- $\frac{2\pi}{15}$
- $\frac{8\pi}{15}$

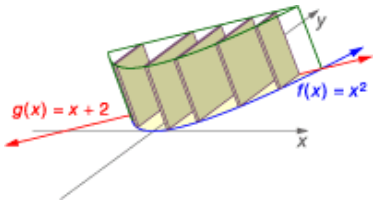
11) QID: 20299

Which of the following is the average value of $f(x)$ on the interval $[a, b]$?

- $\int_a^b f(x)dx$
- $\frac{f(b) + f(a)}{b - a}$
- $\frac{1}{a - b}\int_a^b f(x)dx$
- $\frac{1}{b - a}\int_a^b f(x)dx$

12) QID: 20988

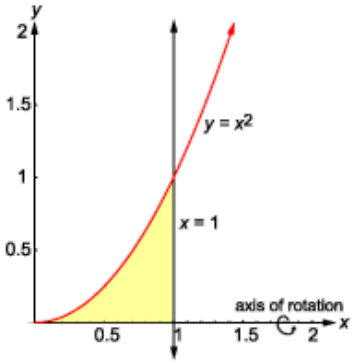
What is the volume of this solid? The base of the solid is bounded by the curves $f(x) = x^2$ and $g(x) = x + 2$, and the cross-sections perpendicular to the x−axis are rectangles of height 1.



- 3/2
- 13/6
- 9/2
- 7/6

13) QID: 21445

Which of the following is the volume of the solid of revolution formed by revolving the region bounded by $y = x^2$ and $x = 1$ around the x-axis, where $x \geq 0$. Use the cylindrical shell method.



- $\frac{4\pi}{5}$
- $\frac{\pi}{5}$
- $\frac{\pi}{2}$
- $\frac{\pi}{6}$

14) QID: 27330

What is the average value of $\sin x$ on $[0, \pi/2]$?

- 0
- 1
- $2/\pi$
- $1/\pi$

15) QID: 27373

Find the volume of the solid of revolution obtained by rotating the region bounded by $y = 4 - x^2$, $x = 1$, the x-axis, and the y-axis about the y-axis.

- $3\pi/2$
- $7\pi/2$
- π
- $5\pi/2$

16) QID: 27508

What is the volume of the solid of revolution obtained by rotating the region bounded by $y = 2x^2 + 1$, $x = 1$, and $x = 0$ around the x-axis?

- $\frac{32\pi}{15}$
- $\frac{47\pi}{5}$
- $\frac{47\pi}{15}$
- $\frac{4\pi}{15}$

17) QID: 27638

A force of $2x + 5$ pounds at a point x feet from the origin moves an object from $x = 2$ to $x = 5$. What is the work done?

- 25 ft-lb
- 11 ft-lb
- 36 ft-lb
- 46 ft-lb

18) QID: 27735

What is the volume of the solid whose cross-sections perpendicular to the x axis are squares based on the region bounded by $y = x$, $y = 0$, the x-axis and x=1?

- 1
- 1/3
- 1/2
- 1/4

19) QID: 29473

The proof of the formula for the length of a curve depends strongly on which of the following theorems?

- Mean value theorem for derivatives
- Theorem of product rule
- Fundamental theorem of calculus
- Pythagorean theorem

20) QID: 29668

Compute the length of the smooth arc $y = \ln|\cos x|$ on $[0, \pi/4]$.

- $\ln\left(\sqrt{2}+1\right) - e$
- The arc length is not finite.
- $\ln\left(\sqrt{2}\right)$
- $\ln\left(\sqrt{2}+1\right)$

21) QID: 11948

Find the vertical asymptotes of the curve:

$$y = \frac{x^2 - x - 6}{x^2 + x - 2}.$$

- $x = -2$, $x = 1$, and $x = 3$
- $x = -2$ and $x = 1$
- $x = 1$
- There are no vertical asymptotes.