

Test #4, Version 1**Student Name:** _____**Question 1**

The function $f(t)$ gives the number of gallons of fuel used per minute by a jet plane t

minutes into a flight. The integral $\int_0^{30} f(t) dt$ represents:

- ☐ (a) The average fuel consumption during the first half-hour of the trip.
- ☐ (b) The average fuel consumption during any 30-minute period on the trip.
- ☐ (c) The total fuel consumption during the first 30 minutes of the trip.
- ☐ (d) The total time it takes to use up the first 30 gallons of fuel.
- ☐ (e) The average rate of fuel consumption during the time it takes to use up the first 30 gallons.

Question 2

Using the Fundamental Theorem, evaluate the definite integral.

$$\int_0^3 (6x^2 + 9) dx$$

Enter the exact answer.

$$\int_0^3 (6x^2 + 9) dx = \boxed{}$$

Question 3

Evaluate the definite integral exactly, using the Fundamental Theorem, and numerically.

$$\int_0^7 2e^x dx =$$

Round your answer to three decimal places.

$$\int_0^7 2e^x dx = \boxed{}^{*1}$$

Significant digits are disabled; notolerance

Question 4

If t is in years, and $t = 0$ is January 1, 2005, worldwide energy consumption, r , in

quadrillion (10^{15}) BTUs per year, is modeled by

$$r = 462e^{0.019t}.$$

(a) Write a definite integral for the total energy use between the start of 2005 and the start of 2017.

Total
energy
used
=

quadrillion
BTUs

(b) Use the Fundamental Theorem of Calculus to evaluate the integral.

Round your answer to the nearest integer.

Total energy used = $\boxed{}^{*1}$ quadrillion BTUs

Significant digits are disabled; notolerance

Question 5

What is the average value of $f(x) = \sqrt{16 - x^2}$ over the interval $0 \leq x \leq 4$?

Round your answer to two decimal places.

Average value = *1

Significant digits are disabled; notolerance

Question 6

Find the average value of the function $g(t) = e^t$ over the interval $[0, 6]$.

Round your answer to one decimal place.

Average value = *1

Significant digits are disabled; notolerance

Question 7

Using the Fundamental Theorem, evaluate the definite integral.

$$\int_1^4 \frac{3}{\sqrt{x}} dx$$

Enter the exact answer.

$$\int_1^4 \frac{3}{\sqrt{x}} dx = \boxed{}$$

Question 8

Find the exact area of the shaded region in Figure 6.7.

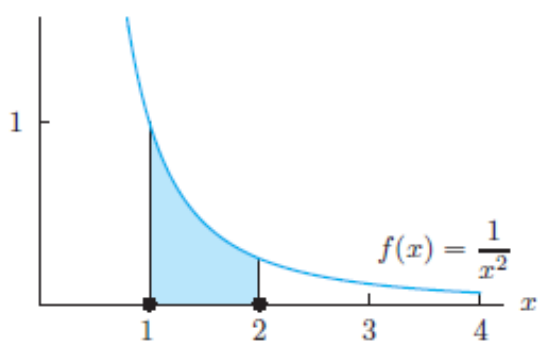


Figure 6.7

- ☐ (a) 1
- ☐ (b) 7/4
- ☐ (c) 1/2
- ☐ (d) -1/2

Question 9

Find the exact area of the region bounded by the x -axis and the graph of

$$y = x^3 - x.$$

Area = *1

Significant digits not applicable; exact number, no tolerance

Question 10

Find the average value of the function $g(t) = 1 + t$ over the interval $[0, 10]$.

Average value =