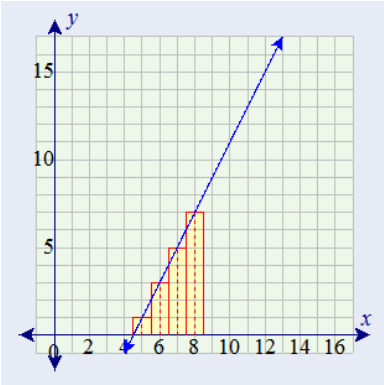
WebTest Name: (Test)

1. Use integration by substitution to solve the integral below.

$$\int 4e^{-7x}\,dx$$

2. Biologists are treating a pond contaminated with bacteria. The level of contamination is changing at a rate of $\frac{dN}{dt} = -\frac{3150}{t^4} - 220$ bacteria per cubic centimeter per day, where t is the number of days since treatment began. Find a function $N(t)$ to estimate the level of contamination if the level after 1 day was 6530 bacteria per cubic centimeter.

3. Find the total area of the red rectangles in the figure below, where the equation of the line is $f(x) = 2x - 9$.



Area = ☐

4. Find the area of the region bounded by the graphs of the given equations.

$$y = x^2 - 2x - 2,\ y = x + 2$$

Enter your answer below.

5. A beauty supply store expects to sell 110 flat irons during the next year. It costs $3.75 to store one flat iron for one year. There is a fixed cost of $8.25 for each order. Find the lot size and the number of orders per year that will minimize inventory costs.

6. Use integration by parts to solve the integral below.

$$\int \ln(9x) \cdot x^6 \, dx$$

7. Determine whether $f(x)$ is a probability density function on the interval $\left[1, e^6 \right]$. If not, determine the value of the definite integral.

$$f(x) = \frac{1}{6x}$$