

Calculus

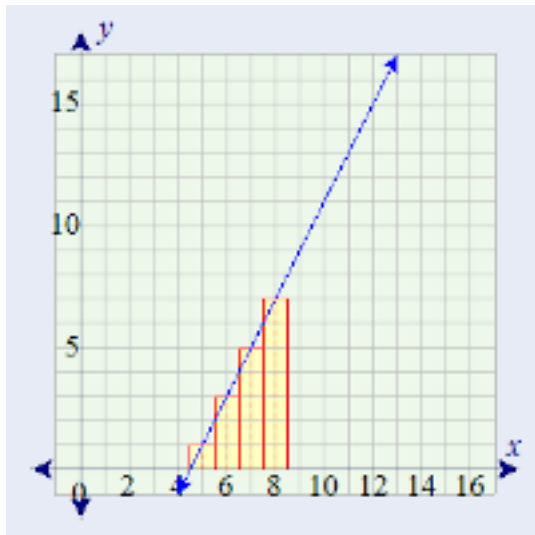
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1. Use integration by substitution to solve the integral below.

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

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 $f(x) = 2x - 9$.



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

$$y = x^2 - 2x - 2$$

$$y = x + 2$$

5. A beauty supply store expects to sell 110 flat irons during the next year. It costs \$3.75 to store on 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.