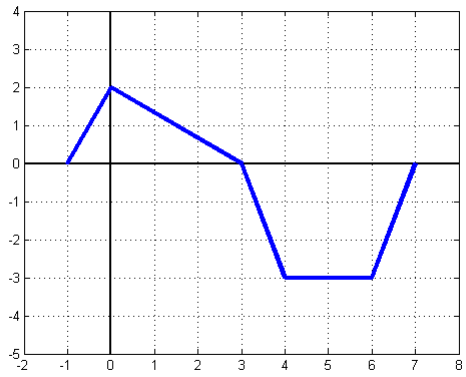
Definite Integrals

Name:

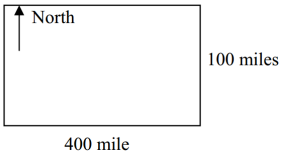
1. The figure below shows a graph of $y = f(x)$. Use geometry to calculate $\int_{-1}^{7} f(x)dx$



2. Water is flowing into a reservoir at a rate of $r(t)$ gallons per hour, where t is measured in hours. Give a practical interpretation of $\int_{0}^{4} r(t)dt$.

3. A log begins to lose weight after it is cut due to drying. If $\int_{0}^{100} w(t)dt$ represents the total weight loss (in pounds) due to drying over the first 100 days, what does $w(t)$ represent? Include units.

4. The density of trees in the rectangular plot of forest shown below is given by the function $\delta(x)$, measured in hundreds of trees per square mile, where x represents the number of miles from the eastern edge of the plot. Set up a definite integral to represent the total number of tress in this plot.



5. From January through June, the daily high temperature in Tucson increases at a rate of $0.015t + 1.336°$F per week, where t is measured in weeks.

   (a) Write a definite integral to represent the change in the daily high temperature in Tucson from January 1 though June 30 (26 weeks).

   (b) Use the Fundamental Theorem of Calculus to evaluate the integral you wrote down in part (a).

   (c) If the daily high temperature on January 1 was 65°F, what will be the daily high temperature by the end of June?