Section 8.7 Trapezoidal Approximation

Use the (a) Trapezoidal Rule and (b) Midpoint Rule to approximate the area between the given curve and the x-axis on the given interval with the given number of intervals n.

1. $\sqrt[4]{1+x^{2}}$ , [0, 2], n = 8 2. $e^{1/x}$ , [1, 2], n = 4 3. $\frac{1}{1+x^{5}}$ , [0,3], n = 6

4. The graph of the function f over the

interval [1,7] is shown. Estimate the area

 under the curve using (a) 3 subintervals

and (b) 6 intervals.

5. An experiment was performed in which oxygen was produced at a continuous rate. The rate at which oxygen was produced was measured each minute and the results tabulated. Use the trapezoid rule to estimate the total amount of oxygen produced in 6 minutes.

6. Below is a chart representing John's rate of hair loss (in follicles per day) on various days throughout a two-week period. Use 6 trapezoids to approximate John's total hair loss over the 14-day period.

|  |  |
| --- | --- |
| **Day** | **Hair Loss** |
| **1** | **2** |
| **4** | **7** |
| **6** | **9** |
| **9** | **5** |
| **11** | **13** |
| **13** | **17** |
| **14** | **21** |





6. We can't use the formula of Trapezoid rule, because not all of the trapezoids have the same width.

Therefore, each trapezoid's width is to be calculated separately.

Add the areas of all the trapezoids to find the total hair loss of John.

Area of a trapezoid = 1 / 2 x width x (sum of parallel bases)

Hence, JohnÃ¢â‚¬â„¢s total hair loss ≈1 / 2(3(2 + 7) + 2(7 + 9) + 3(9 + 5) + 2(5 + 13) + 2(13 + 17) + 1(17 + 21))

= 1 / 2(27 + 32 + 42 + 36 + 60 + 38)

= 117.5 follicles