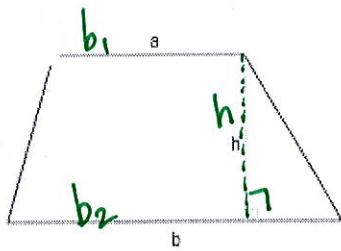


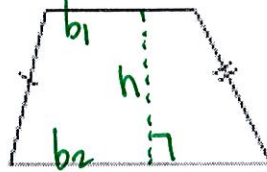
Notes: Approximating Using Trapezoidal Rule

Trapezoid: A quadrilateral which has at least one pair of parallel sides.

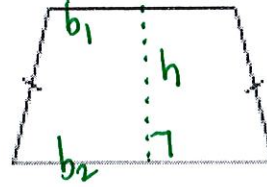


a // b: bases  
h: altitude

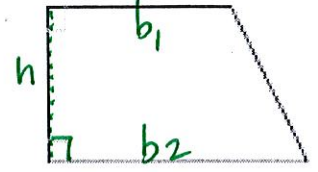
Scalene trapezoid



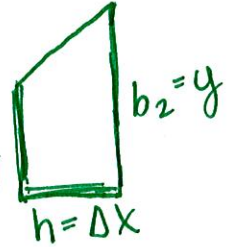
Isosceles trapezoid



Right trapezoid



Trapezoids we will use will be the right trapezoid. The  $Area = \frac{h}{2} (b_1 + b_2)$



Example One: Given  $f(x) = \ln(x) + 2$ ,  $[1, 4]$

A. Approximate the Area with  $T_3$

$$\text{height} = \frac{4-1}{3} = \frac{3}{3} = 1$$

$$A = \frac{h}{2} [b_1 + b_2]$$

$$\frac{1}{2} [f(1) + f(2) + f(2) + f(3) + f(3) + f(4)]$$

$$\frac{1}{2} [2 + 2(2.6931) + 2(3.0986) + 3.3863]$$

$$= 8.484 \text{ OR } 8.485$$



B. Approximate the Area with  $T_6$

$$\text{height} = \frac{4-1}{6} = \frac{3}{6} = \frac{1}{2}$$

$$A = \frac{h}{2} [b_1 + b_2]$$

$$\frac{.5}{2} [f(1) + f(1.5) + f(1.5) + f(2) + f(2) + f(2.5) + f(2.5) + f(3) + f(3) + f(3.5) + f(3.5) + f(4)]$$

$$.25 [2 + 2(2.4055) + 2(2.6931) + 2(2.9163) + 2(3.0986) + 2(3.2528) + 3.3863]$$

$$= 8.529 \text{ OR } 8.53$$