

CHAPTER 18 - ESTIMATING AREA USING RECTANGLES

TI-84 Plus

To calculate the lower and upper sums for the area between the graph of $y = x^2$ and the x -axis on the interval $0 \leq x \leq 1$ using 4 equal subdivisions:

Step 1 Press **2nd** **STAT** (**LIST**) **◀** to select the **MATH** menu, then scroll down to **5:sum(** and press **ENTER** .

```
NAMES OPS MATH
1:min(
2:max(
3:mean(
4:median(
5:sum(
6:prod(
7:stdDev(
```

Step 2 Press **2nd** **STAT** (**LIST**) **▶** to select the **OPS** menu, then scroll down to **5:seq(** and press **ENTER** .

```
NAMES OPS MATH
1:SortA(
2:SortD(
3:dim(
4:Fill(
5:seq(
6:cumSum(
7:ΔList(
```

Step 3 Enter the expression $1 \div 4 \times (X \div 4)^2$.

```
sum(seq(1/4*(X/4)
)²
```

Step 4 We will first calculate the lower sum. Press **▢** **X,T,θ,n** **▢** **0** **▢** **3** **▢** to indicate that x ranges from 0 to 3.

```
sum(seq(1/4*(X/4)
)²,X,0,3)▢
```

Step 5 Press **STO▶** **ALPHA** **L** followed by **ENTER** to calculate the lower sum and store it in the variable L .

```
sum(seq(1/4*(X/4)
)²,X,0,3)+L
.21875
```

Step 6 We can repeat this process to calculate the upper sum. The only difference is that x ranges from 1 to 4 instead of 0 to 3 and we store the result in a different variable, U .

```
sum(seq(1/4*(X/4)
)²,X,0,3)+L
.21875
sum(seq(1/4*(X/4)
)²,X,1,4)+U
.46875
```

Step 7 Finally, calculate the average of the upper and lower sums $(U + L) \div 2$ to obtain an estimate of the area.

```
)²,X,0,3)+L
.21875
sum(seq(1/4*(X/4)
)²,X,1,4)+U
.46875
(U+L)/2
.34375
```

You should be able to adapt these instructions to calculate lower and upper sums for different values of n (the number of subdivisions).