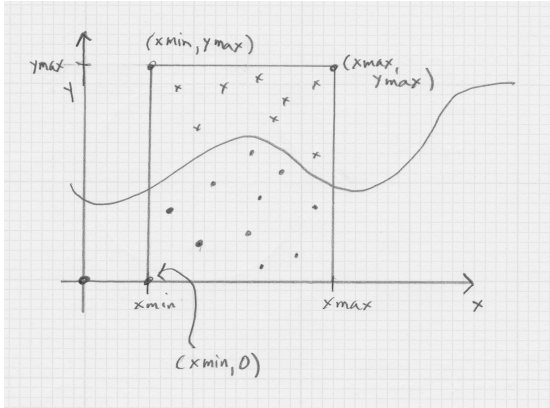


Monte Carlo method: integration

Problem setup:

Draw a single valued function, $y = f(x)$ on a 2D coordinate system. Draw a bounding box around the area of interest. See the figure.



The area under the curve is $(\# \text{ points under the curve} / \# \text{ points in bounding box}) * \text{area of bounding box}$.

Pseudocode:

```
// bounding box, bb, has corners located at (xmin, 0) and (xmax, ymax)
// where ymax is some value of y that is large enough.
```

```
bbCount = 0;
```

```
bbArea = (xmax - xmin) * ymax;
```

```
curveCount = 0;
```

```
repeat many times {
```

```
    // generate (x, y) within bounding box
```

```
    generate random x between xmin and xmax;
```

```
    generate random y between 0 and ymax;
```

```
    bbCount++; // increment area of bb counter
```

```
    if ( y <= f(x) )
```

```
        curveCount++; // generated point is under curve
```

```
    }
```

```
return (curveCount / bbCount) * bbArea;
```