Riesketcher

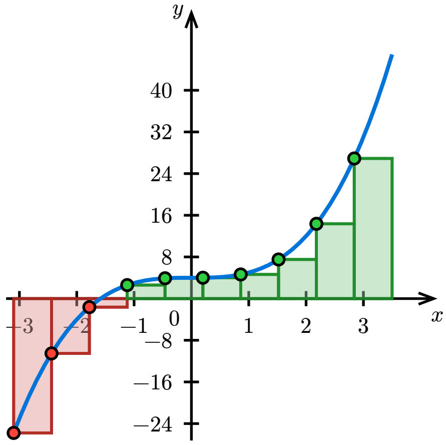
A package to draw Riemann sums (and their plots) of a function with CeTZ.

```
#import "@preview/riesketcher:0.3.0": riesketcher
```

Examples

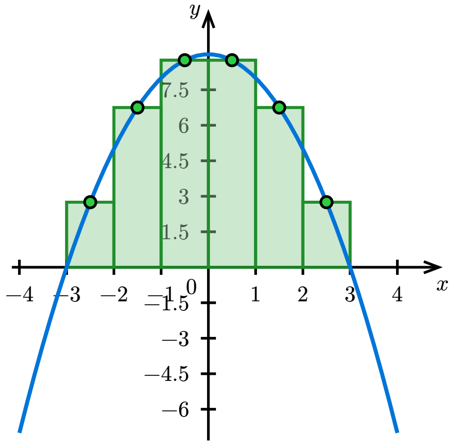
Left-Hand Riemann sum

```
riesketcher(
    x => calc.pow(x, 3) + 4,
    method: "left",
    start: -3.1,
    end: 3.5,
    n: 10,
    plot-x-tick-step: 1,
)
```



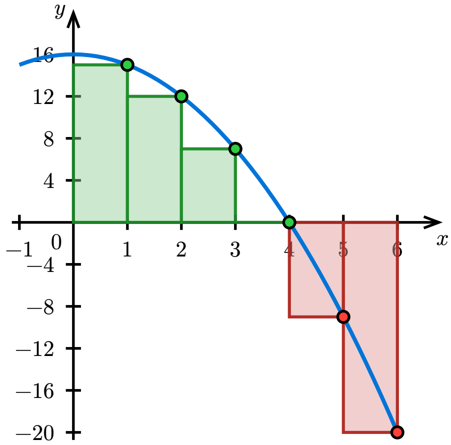
Midpoint Riemann sum

```
riesketcher(
    x => -calc.pow(x, 2) + 9,
    method: "mid",
    domain: (-4, 4),
    start: -3,
    end: 3,
    n: 6,
    plot-x-tick-step: 1,
)
```



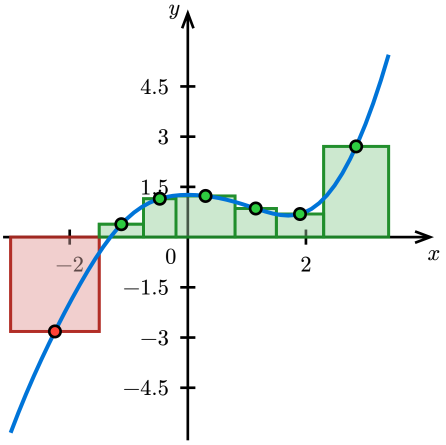
Right-method Riemann sum

```
riesketcher(
    x => 16 - x * x,
    method: "right",
    end: 6,
    n: 6,
    domain: (-1, auto),
    plot-x-tick-step: 1,
)
```



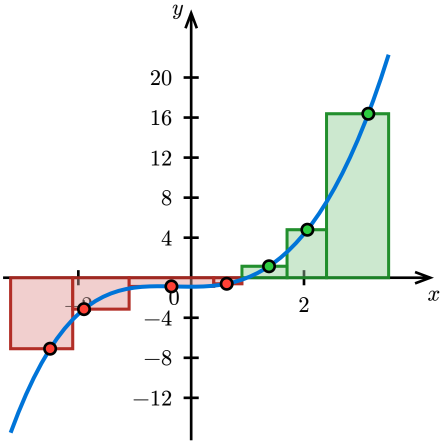
Custom untagged partition (midpoint method)

```
riesketcher(
  x => 0.17 * calc.pow(x, 3)
    + 1.5 * calc.sin(calc.cos(x)),
  method: "mid",
  partition: (-3, -1.5, -0.75, -0.2, 0.8, 1.5,
    2.3, 3.4),
  plot-x-tick-step: 2,
)
```



Tagged partition

```
riesketcher(
  x => 0.5 * calc.pow(x, 3)
    - 0.9 * calc.cos(x),
  partition: (-3.2, -2.1, -1.1, 0.4, 0.9, 1.7,
    2.4, 3.5),
  tags: (-2.5, -1.9, -0.35, 0.63, 1.38, 2.06, 3.14),
  plot-x-tick-step: 2,
)
```



Method parameters

riesketcher

- riesketcher()

riesketcher

Draw a Riemann sum of a function, and optionally plot the function.

Parameters

```
riesketcher(
  fn: function,
  start: number,
  end: number,
  domain: array,
  n: number,
  partition: array none,
  tags: array none,
  method: string,
  transparency: number,
  dot-radius: number,
  plot: boolean,
  plot-grid: boolean,
  plot-x-tick-step: number,
  plot-y-tick-step: number,
  positive-color: color,
  negative-color: color,
  plot-line-color: color,
  size: tuple
)
```

fn `function`

The function to draw a Riemann sum of.

start `number`

The starting point for the bars. Used only if `partition` is not a valid array; otherwise, the first value of `partition` is used.

Default: `0`

end `number`

The ending point for the bars. Used only if `partition` is not a valid array; otherwise, the last value of `partition` is used.

Default: `10`

domain `array`

Tuple of the domain of fn. If a tuple value is auto, that value is set to start/end.

Default: `(auto, auto)`

n `number`

Number of bars. Used only if `partition` is not a valid array; otherwise, the number of bars is determined by the length of `partition`.

Default: `10`

partition `array` or `none`

(optional) Array of partition points. If valid, it overrides `start`, `end`, and `n`; otherwise, equal partitions are generated from `start`, `end`, and `n`.

Default: `none`

tags `array` or `none`

(optional) Array of sample points for bar heights. If valid, it overrides `method`; otherwise, sample points are determined by `method`.

Default: `none`

method `string`

Determines where the sample points for bar heights are taken (“left”, “mid”/“midpoint”, or “right”). Used only if `tags` is not a valid array; otherwise, bar heights are taken from `tags`.

Default: `"left"`

transparency `number`

Transparency fill of bars.

Default: `40%`

dot-radius `number`

Radius of dots.

Default: `0.15`

plot `boolean`

Whether to add plot of the function.

Default: `true`

plot-grid `boolean`

Show grid on plot.

Default: `false`

plot-x-tick-step `number`

X tick step of plot.

Default: `auto`

plot-y-tick-step `number`

Y tick step of plot.

Default: `auto`

positive-color `color`

Color of positive bars.

Default: `color.green`

negative-color `color`

Color of negative bars.

Default: `color.red`

plot-line-color `color`

Color of plotted line.

Default: `color.blue`

size `tuple`

The width and height of the plot area, given as a tuple `(width, height)`. Controls the overall size of the rendered Riemann sum and function plot.

Default: `(5, 5)`