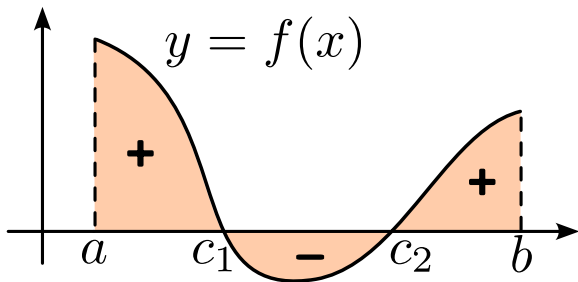


# Integration: Applications

## Introduction to Engineering Mathematics

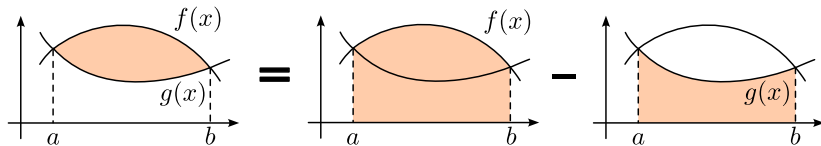
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## Reminder: area under the curve



$$\text{Area} = \int_a^{c_1} f(x)dx - \int_{c_1}^{c_2} f(x)dx + \int_{c_2}^b f(x)dx.$$

## Area between two curves



## Recipe for finding the area

- ① Make a figure
- ② Determine intersection points
- ③ Figure out which curve is upper/lower
- ④ Integrate

## Example

Find the area bounded by  $y = \sin x$ ,  $y = 0$ , and  $x = \frac{3\pi}{2}$ .

## Example

Find the area of the region between the curves  $y = x^2 - 2x$  and  $y = 4 - x^2$ .

## Example

Find the area of the region between  $x = 12 - y^2$  and  $y = -x$ .