

## Applications of definite integral

### Surface

1. Compute the area between the graph of the function  $y(x) = x\sqrt{1-x^2}$  and  $x$ -axis for  $x \in \langle 0; 1 \rangle$ .
2. Sketch the region bounded by given curves and evaluate its area:  
 $y = 3 - 2x - x^2$  and  $y = 0$ .
3. Sketch the region bounded by given curves and evaluate its area:  
 $y = x^2$  and  $y = \sqrt{x}$ .

### Volume of rotational bodies

4. Evaluate the volume of the circular body that arises by rotation of a curve  $y = \sin x$  around the  $x$ -axis for  $x \in \langle 0; \frac{\pi}{2} \rangle$ .
5. Evaluate the volume of the circular body that arises by rotation of a region bounded between  $y = \sqrt{8x}$  and  $y = x^2$ 
  - (a) around the  $x$ -axis.
  - (b) around the  $y$ -axis.

## Improper Riemann integral

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|---|--|
| 1. $\int_0^4 \frac{1}{\sqrt{x}} dx$         | 2. $\int_1^e \frac{1}{x \ln x} dx$               |
| 3. $\int_1^\infty \frac{1}{\sqrt[3]{x}} dx$ | 4. $\int_{16}^\infty \frac{1}{\sqrt[4]{x^5}} dx$ |
| 5. $\int_{\pi/2}^\infty \sin x dx$          | 6. $\int_1^\infty \frac{1}{x(x+1)^2} dx$         |