

Announcements

- Exam 2 this week
 - Cheat Sheet due @ 8:00 am tomorrow
 - Exam 2 available on onCourse @ 8:00 am tomorrow
 - Remember Reference Sheet & Honor Code pledge
 - Major emphasis in grading (and the course!) is quality of explanation of solutions
- No questions to submit for tomorrow's PCA
- Next week: No Problem Set, WeBWorK due Thursday
- Consider taking Calc II next semester!
 - I'll be glad to chat individually

Definition: The *indefinite integral* of $f(x)$ with respect to x is

$$\int f(x) \, dx = F(x) + c$$

where $F(x)$ is an antiderivative of $f(x)$.

$$\int 3x^2 + x + \pi \, dx =$$

(a) $6x + 1$

(b) $x^3 + x^2 + c$

(c) $x^3 + \frac{x^2}{2} + \pi x$

(d) $x^3 + \frac{x^2}{2} + \pi x + c$

(e) $x^3 + x^2 + \pi + c$

$$\int \frac{1}{x^2} + \cos(x) \, dx =$$

(a) $\frac{1}{2x} - \sin(x) + c$

(b) $-\frac{1}{x^3/3} - \sin(x)$

(c) $\frac{1}{x} - \sin(x) + c$

(d) $\ln(x^2) + \sin(x) + c$

(e) $-\frac{1}{x} + \sin(x) + c$

$$\int \frac{1}{x} + 3e^x dx = \ln(x) + 3e^x + c$$

- (a) True, and I can explain why
- (b) True, but I am unsure why
- (c) False, and I can explain why
- (d) False, but I am unsure why
- (e) Ummm. . .

$$\int 2xe^{-x^2} dx = e^{-x^2} + c$$

- (a) True, and I can explain why
- (b) True, but I am unsure why
- (c) False, and I can explain why
- (d) False, but I am unsure why
- (e) Ummm. . .

$$\int 2x \cos(x) - x^2 \sin(x) \, dx = x^2 \cos(x) + c$$

- (a) True, and I can explain why
- (b) True, but I am unsure why
- (c) False, and I can explain why
- (d) False, but I am unsure why
- (e) Ummm. . .

$$\int \ln(x) dx = x \ln(x) - x + c$$

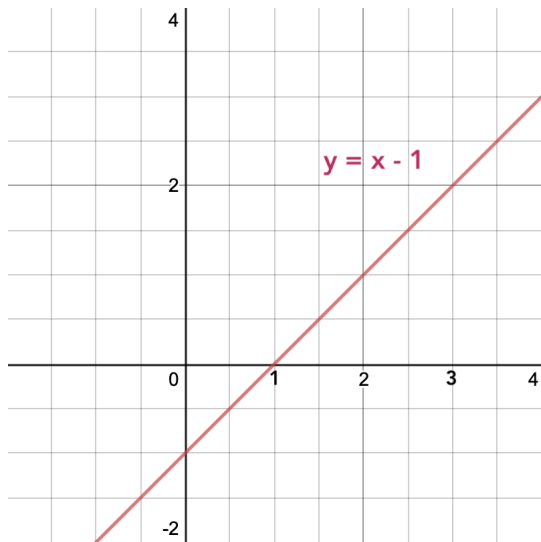
- (a) True, and I can explain why
- (b) True, but I am unsure why
- (c) False, and I can explain why
- (d) False, but I am unsure why
- (e) Ummm. . .

Definition: If $f(x)$ is defined on the interval $[a, b]$, then define

$$\int_a^b f(x) \, dx = \text{the signed area between } y = f(x) \text{ and the } x\text{-axis over } [a, b]$$

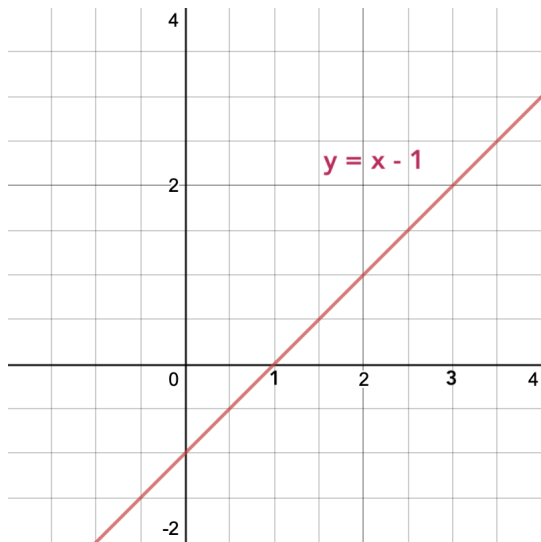
By *signed* area, we mean that we will consider area below the x -axis as negative.

Example



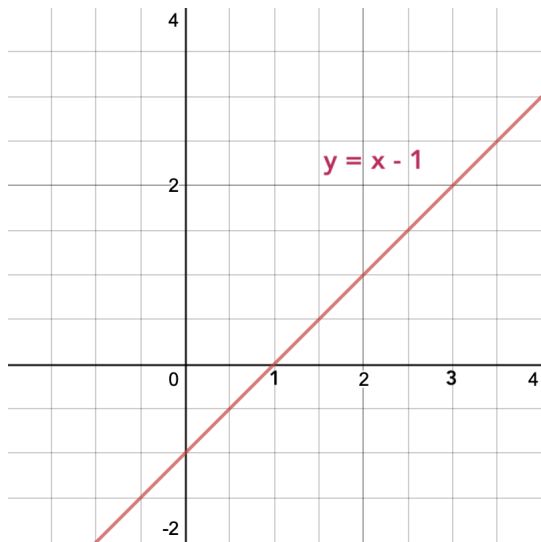
$$\int_1^3 x - 1 \, dx$$

Example



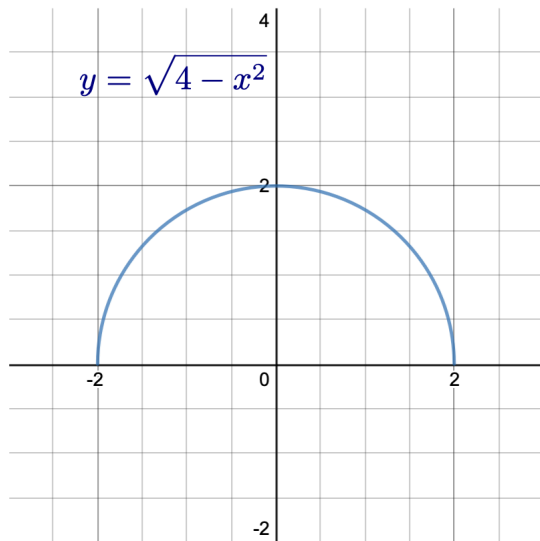
$$\int_0^1 x - 1 \, dx$$

Example



$$\int_0^3 x - 1 \, dx$$

Example



$$\int_{-2}^2 \sqrt{4 - x^2} \, dx$$