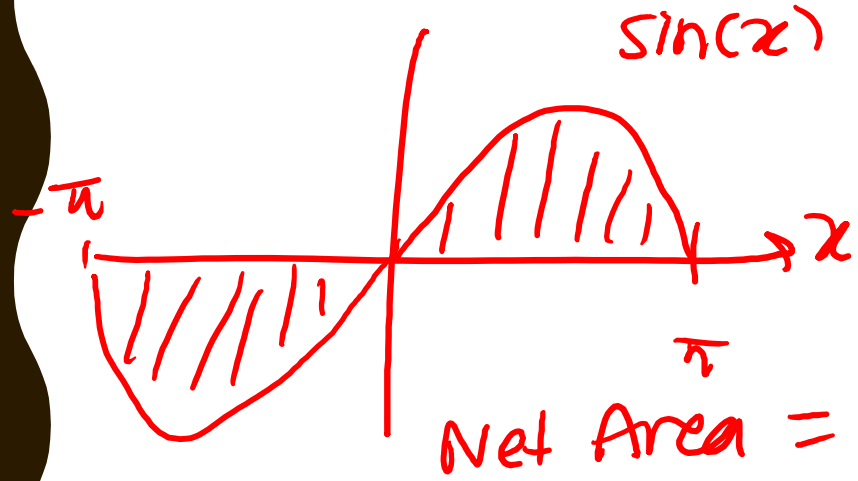
LESSON 33

MA 16100 · FALL 2022

DR. HOOD

WARM UP

Use the Fundamental Theorem of Calculus to calculate the definite integral:



$$\int_{-\pi}^{\pi} \sin(x)\,dx = \Big[-\cos(x)\Big]_{-\pi}^{\pi}$$

$$= -\cos(\pi) + \cos(-\pi)$$

$$= -(-1) + (-1)$$

$$= 0$$

a) 2

b) -1

c) 0

ANNOUNCEMENTS

- Dr. Hood's Office Hours in Math 844
  - Mon, Wed: 3:30-4:30pm
  - Fri: 2:30-3:30pm

- TA's Office Hours in Math Resource Room (WTHR 313)
  - Mon – Thu: 9:30am – 8:30pm
  - Fri: 9:30am – 3:30pm

THANKSGIVING BREAK

- University Holiday is Wed Nov 23 – Fri Nov 25
- MA 161 additional breaks:
  - No class on Mon Nov 21
  - No recitation on Tue Nov 22
  - No HW or Quizzes that week
  - No Office Hours on Mon Nov 21
  - Math Resource Room closed Mon Nov 21 – Fri Nov 25
  - No SI on Nov 20 – Nov 25

POLL 1

Is $f(x) = 1 + |x|^3$ odd, even, or neither?

$f(-x) = 1 + |-x|^3 = 1 + |x|^3 = f(x)$

even

a) Odd

b) Even

c) Neither

$$\int_{-a}^{a} f(x)\,dx = 2\int_{0}^{a} (1 + |x|^3)\,dx$$

$$= 2\int_{0}^{a} (1 + x^3)\,dx$$

POLL 2

$F(x)$ is an antideriv

$F'(x) = f(x)$

Which function is an antiderivative of

$$f(x) = (x^2+3)^4(2x)?$$

a) $(x^2+3)^4$

b) $\frac{1}{5}(x^2+3)^5$

c) $(x^2+3)^5(2x)$

Chain Rule

$u = x^2+3$

$$\frac{d}{dx}\left[\frac{1}{5}(x^2+3)^5\right] =$$

$$= \frac{d}{dx}\left[\frac{1}{5}u^5\right] = \frac{d}{du}\left[\frac{u^5}{5}\right]\cdot\frac{du}{dx}$$

$$= \frac{5u^4}{5}\cdot\frac{du}{dx} = (x^2+3)^4(2x)$$

POLL 3

If you want to use u-substitution to calculate the antiderivative:

$$\int \frac{\sin(x)}{\cos(x)}\,dx$$

$= \int -\frac{du}{u}$

$= -\ln|u| + C$

$= -\ln|\cos(x)| + C$

What should you choose to be u?

$\int \frac{u\,du}{\cos^2(x)}$

a) $u = \cos(x)$ $du = -\sin(x)dx$

b) $u = \sin(x)$ $du = \cos(x)dx$

c) $u = \tan(x)$ $du = \sec^2(x)dx$