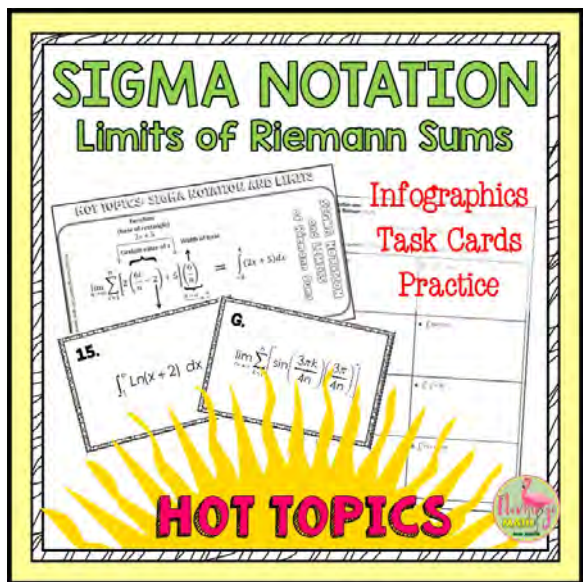




HOT TOPICS Sigma Notation & Limits of Riemann Sums

Your AP Calculus students will have an infographic card, practice sets, and a set of task cards for writing limits of Riemann Sums and Sigma Notation.

This **HOT TOPIC** is made for your AP Calculus students to gain proficiency in their ability to interpret the definite integral as the limit of a Riemann Sum and vice versa. You will find a **set of practice questions** that can be used as a homework assignment, a set of **TASK CARDS**, and an **INFOGRAPHIC** that students can use as a reference tool. There is a student recording sheet for the matching task card activity and an answer key for all items.

What's included?

- ☒ **16 practice questions** that can be used as a homework assignment or quiz
- ☒ **A set of 32 task cards to sort and match into pairs.**
- ☒ **INFOGRAPHIC CARD** that students can use as a reference tool for a page in their Interactive Notebook.
- ☒ There is a student recording sheet for the matching task card activity and an answer key for all items.

Students will practice the following skills:

- ☒ Given a definite integral, write the limit of a Riemann Sum
- ☒ Given the limit of a Riemann Sum, write the definite integral.



Practice

Integral Notation and the Limit of a Riemann Sum

Name _____

$$\lim_{n \rightarrow \infty} \sum_{k=1}^n f(a + k\Delta x) \Delta x = \int_a^b f(x) dx$$

I. Translate the definite integral into a Riemann sum. DO NOT EVALUATE.

1. $\int_1^3 (x+1) dx$

2. $\int_0^3 (x^2+1) dx$

3. $\int_2^5 (2x^2-1) dx$

5. $\int_3^5 (x) dx$

7. $\int_2^5 \sqrt{4x+1} dx$

8. $\int_0^e \ln(x+1) dx$

$$\lim_{n \rightarrow \infty} \sum_{k=1}^n f(a + k\Delta x) \Delta x = \int_a^b f(x) dx$$

II. Translate each Riemann sum into a definite integral. DO NOT EVALUATE.

9. $\lim_{n \rightarrow \infty} \sum_{k=1}^n \left[2 \left(\frac{k}{n} \right) + 3 \right] \left(\frac{1}{n} \right)$

10. $\lim_{n \rightarrow \infty} \sum_{k=1}^n \left[\cos \left(\frac{k\pi}{3n} \right) \right] \left(\frac{\pi}{3n} \right)$

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4. $\lim_{n \rightarrow \infty} \sum_{k=1}^n \left(\frac{1}{n} \right)$

11. $\lim_{n \rightarrow \infty} \sum_{k=1}^n \left[\ln \left(e + \frac{e \cdot k}{n} \right) \right] \left(\frac{e}{n} \right)$

HOT TOPICS: SIGMA NOTATION

Infographic

SIGMA NOTATION and LIMIT

Function of rectangle: $2x + 5$

Custom value of x : $2 \left(\frac{k}{n} \right) + 5$

Width of base: $\left(\frac{6}{n} \right)$

Lower limit of summation: $b - a = \frac{6}{n}$

Upper limit of summation: $b - (-2) = 6$

Number of rectangles: n

Summation: $\lim_{n \rightarrow \infty} \sum_{i=1}^n \left[2 \left(\frac{k}{n} \right) + 5 \right] \left(\frac{6}{n} \right)$

Result: $b = 4$

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Task Cards

1.

$$\int_0^3 x^2 dx$$

A.

$$\lim_{n \rightarrow \infty} \sum_{k=1}^n \left[\left(\left(\frac{5k}{n} \right)^2 \right) \left(\frac{5}{n} \right) \right]$$

5.

$$\int_0^4 (x+1)^2 dv$$

E.

$$\lim_{n \rightarrow \infty} \sum_{k=1}^n \left[\ln \left(3 + \frac{1}{k} \right) \left(\frac{e-1}{n} \right) \right]$$

2.

$$\int_1^5 x^2 dx$$

B.

$$\lim_{n \rightarrow \infty} \sum_{k=1}^n \left[\left(\frac{\pi}{n} \right) \left(\frac{\pi}{n} \right) \right]$$

7.

$$\int_0^4 \sqrt{1+2x} dx$$

G.

$$\lim_{n \rightarrow \infty} \sum_{k=1}^n \left[\sin \left(\frac{3\pi k}{4n} \right) \left(\frac{3\pi}{4n} \right) \right]$$

3.

$$\int_1^5 x^2 dx$$

C.

$$\lim_{n \rightarrow \infty} \sum_{k=1}^n \left[\left(\frac{4k}{n} \right)^2 \left(\frac{4}{n} \right) \right]$$

8.

$$\int_1^5 \sqrt{1+2x} dx$$

H.

$$\lim_{n \rightarrow \infty} \sum_{k=1}^n \left[\left(\left(\frac{3k}{n} \right)^2 \right) \left(\frac{3}{n} \right) \right]$$

4.

$$\int_2^6 x^2 dx$$

D.

$$\lim_{n \rightarrow \infty} \sum_{k=1}^n \left[\sin \left(\frac{\pi}{2} + \frac{\pi k}{n} \right) \left(\frac{\pi}{n} \right) \right]$$

Task Cards

q. $\int_{\pi/2}^{3\pi/2} \sin x \, dx$

J. $\lim_{n \rightarrow \infty} \sum_{k=1}^n \left[\ln \left(1 + \frac{(e+1)k}{n} \right) \left(\frac{e+1}{n} \right) \right]$

13. $\int_{-1}^e \ln(x+2) \, dx$

N. $\lim_{n \rightarrow \infty} \sum_{k=1}^n \left[\ln \left(2 + \frac{ek}{n} \right) \left(\frac{e}{n} \right) \right]$

10. $\int_{\pi/4}^{3\pi/4} \sin x \, dx$

K. $\lim_{n \rightarrow \infty} \sum_{k=1}^n \left[\ln \left(2 + \frac{ek}{n} \right) \left(\frac{e}{n} \right) \right]$

11. $\int_{\pi/6}^{2\pi/3} \sin x \, dx$

12. $\int_{\pi/6}^{2\pi/3} \sin x \, dx$

14. $\int_1^e \ln(x+2) \, dx$

P. $\lim_{n \rightarrow \infty} \sum_{k=1}^n \left[\ln \left(2 + \frac{ek}{n} \right) \left(\frac{e}{n} \right) \right]$

16. $\int_e^{2e} \ln(x+2) \, dx$

Q. $\lim_{n \rightarrow \infty} \sum_{k=1}^n \left[\left(\sqrt{1 + \frac{8k}{n}} \right) \left(\frac{4}{n} \right) \right]$

Definite Integrals and Riemann Sums Task Cards

Name _____

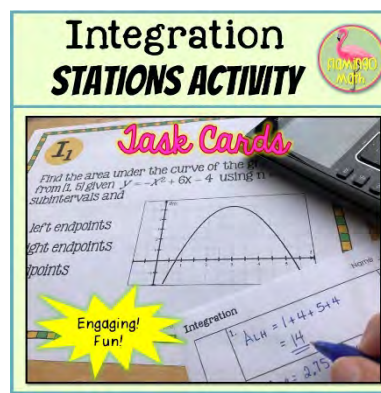
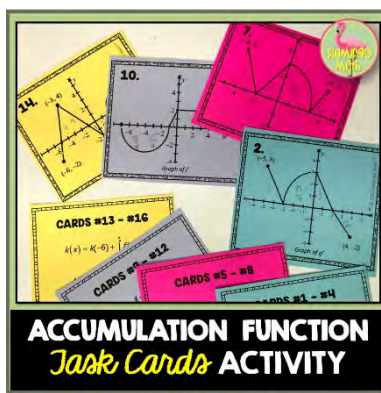
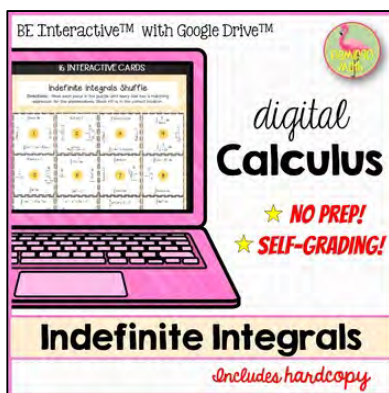
1.	_____
2.	_____
3.	_____
4.	_____
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16.	_____



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