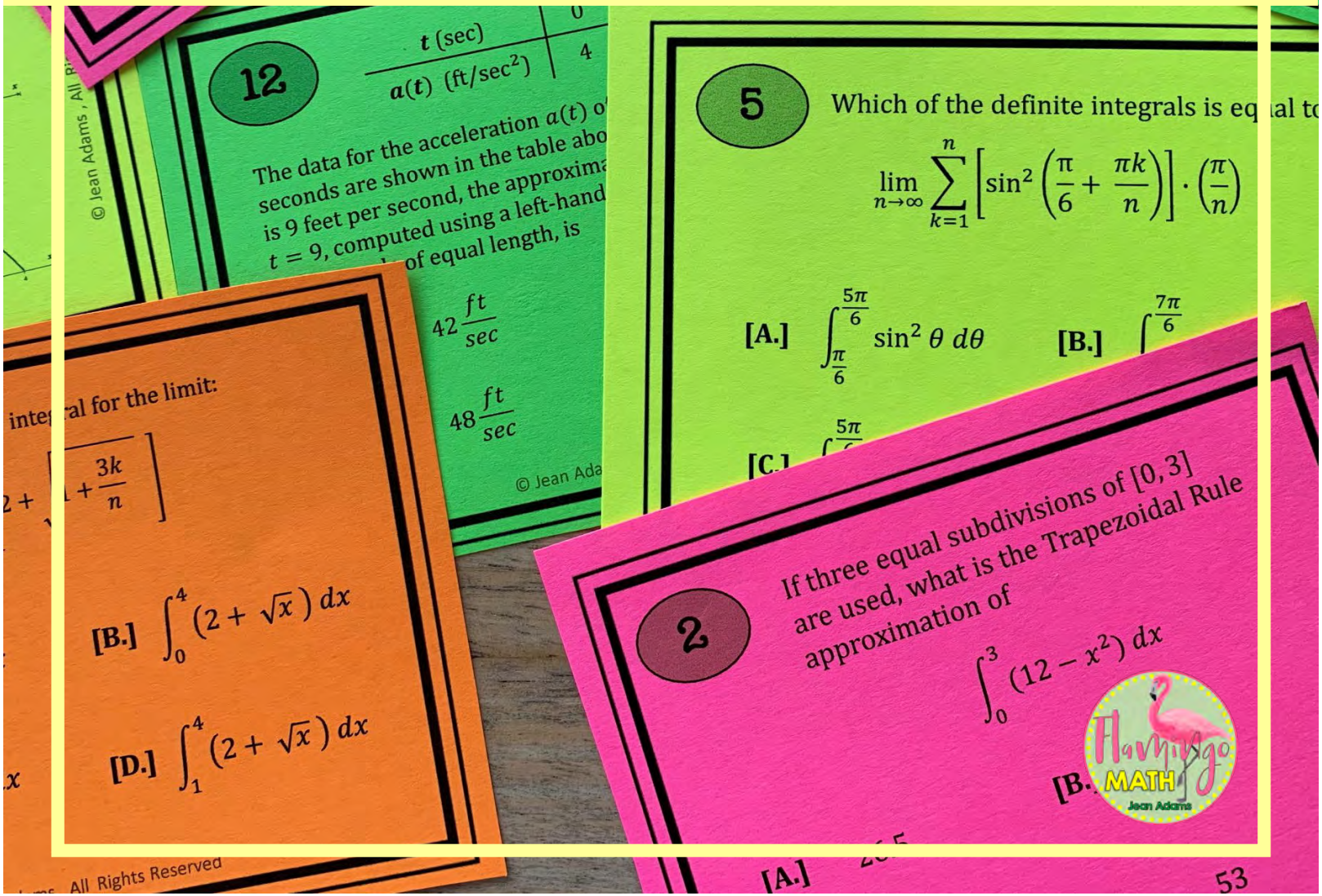
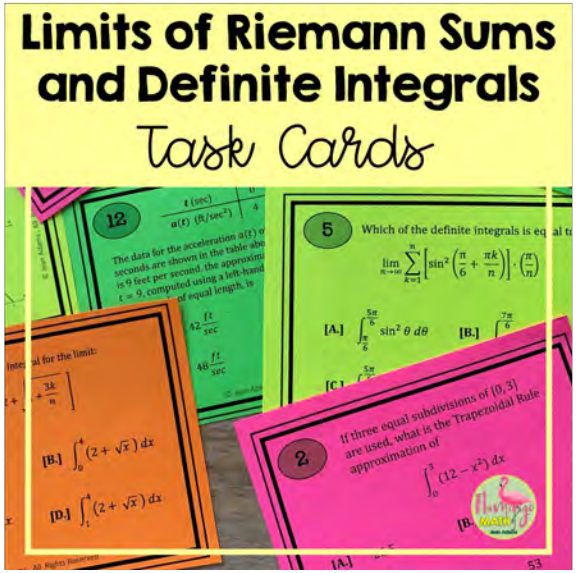
Limits of Riemann Sums and Definite Integrals

Task Cards





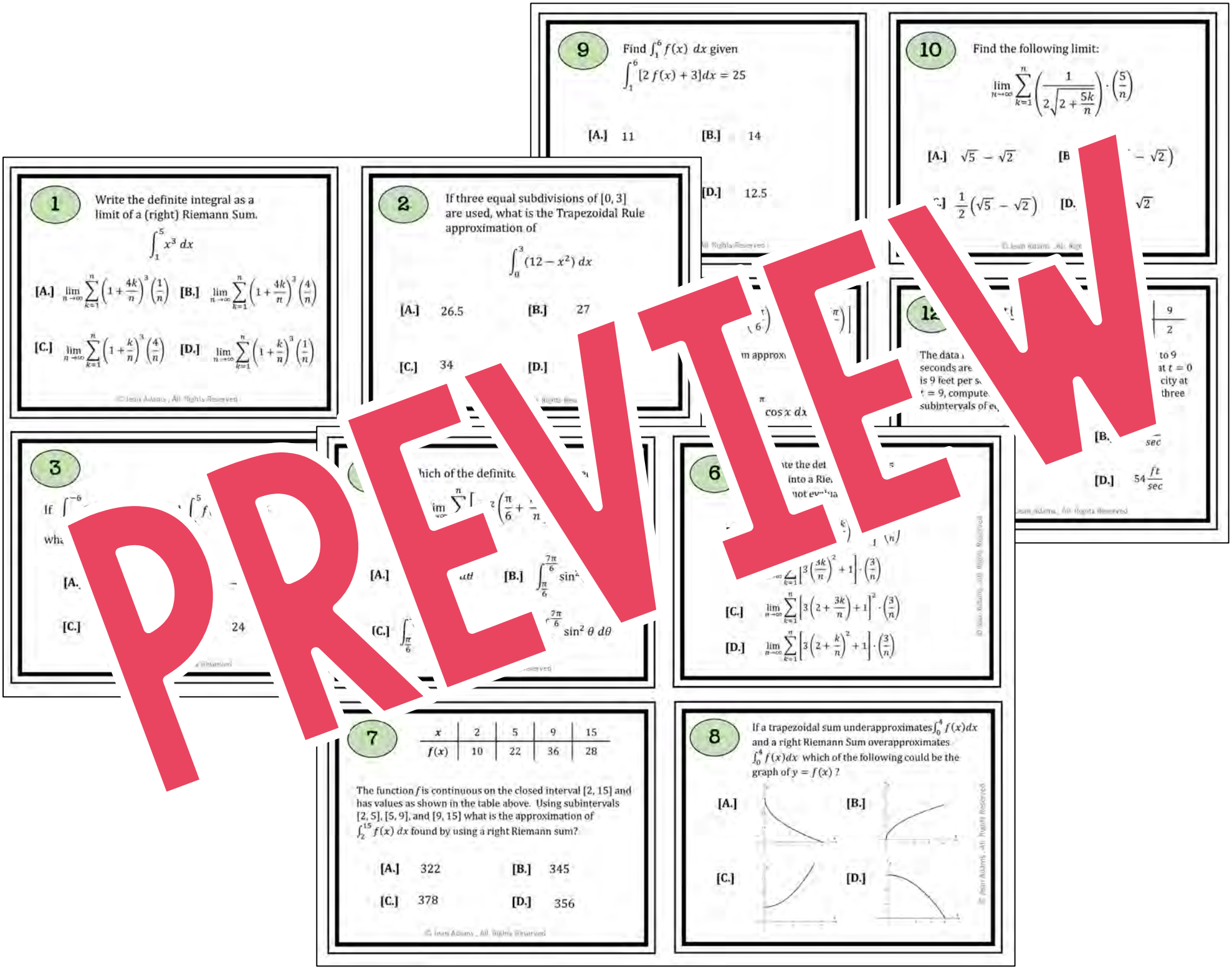
Limits of Riemann Sums and Definite Integrals Task Cards Activity

Your AP Calculus students will have 16 task cards related to your unit on Integration – The Accumulation of Change which can be used as a cooperative activity.

This set of task cards is for use as a cooperative learning activity. They are the same questions as found on the *Limits of Riemann Sums and Definite Integrals for Google Forms™* Product.

QUESTION STEMS:

1. Write definite integral as a limit of a Riemann Sum.
2. Find definite integral using a Trapezoidal Rule.
3. Use properties of definite integrals to evaluate a sum or difference.
4. Given the limit of a Riemann Sum on an interval [*a, b*], evaluate the definite integral.
5. Write a definite integral from the limit of a Riemann Sum.
6. Translate the definite integral as a limit of a Riemann Sum, do not evaluate.
7. Given function values in a table, find the definite integral using right Riemann Sums.
8. Find a graph that will underestimate on trapezoidal sums and overestimate on right Riemann sums.
9. Use properties of definite integrals to resolve the integral for a transformation of the integral.
10. Given the limit of a right Riemann Sum, evaluate.
11. Write a definite integral given the expansion of a summation.
12. Find the velocity of an object given initial values and the acceleration in a table by using left-hand sums.
13. Given a piecewise graph and an integral, evaluate on [*a, b*].
14. Given a table of rate values for a process, use a mid-point sum to evaluate total water flow.
15. Write a definite integral given a limit of a Riemann Sum.
16. Given the limit of a Riemann sum, write the integral.


PREVIEW
1
Write the definite integral as a limit of a (right) Riemann Sum.
$\int_1^5 x^3\,dx$
[A.] $\lim_{n\to\infty}\sum_{k=1}^{n}\left(1+\frac{4k}{n}\right)^3\left(\frac{1}{n}\right)$
[B.] $\lim_{n\to\infty}\sum_{k=1}^{n}\left(1+\frac{4k}{n}\right)^3\left(\frac{4}{n}\right)$
[C.] $\lim_{n\to\infty}\sum_{k=1}^{n}\left(1+\frac{k}{n}\right)^3\left(\frac{4}{n}\right)$
[D.] $\lim_{n\to\infty}\sum_{k=1}^{n}\left(1+\frac{k}{n}\right)^3\left(\frac{1}{n}\right)$
2
If three equal subdivisions of [0, 3] are used, what is the Trapezoidal Rule approximation of
$\int_0^3 (12-x^2)\,dx$
[A.] 26.5
[B.] 27
[C.] 34
[D.]
3
[A.]
[C.] 24
9
Find $\int_1^6 f(x)\,dx$ given
$\int_1^6 [2f(x)+3]dx = 25$
[A.] 11
[B.] 14
[D.] 12.5
10
Find the following limit:
$\lim_{n\to\infty}\sum_{k=1}^{n}\left(\frac{1}{2\sqrt{2+\frac{5k}{n}}}\right)\cdot\left(\frac{5}{n}\right)$
[A.] $\sqrt{5}-\sqrt{2}$
[B.]
[C.] $\frac{1}{2}(\sqrt{5}-\sqrt{2})$
[D.] $\sqrt{2}$
12
The data
seconds are
is 9 feet per s
$t = 9$, compute
subintervals of e
to 9
at $t = 0$
city at
three
[B.] sec
[D.] $54\frac{ft}{sec}$
hich of the definite
[A.]
[B.] $\int_{\frac{\pi}{6}}^{\frac{7\pi}{6}} \sin^2$
[C.] $\int_{\frac{\pi}{6}}^{\frac{7\pi}{6}} \sin^2\theta\,d\theta$
6
[C.] $\lim_{n\to\infty}\sum_{k=1}^{n}\left[3\left(2+\frac{3k}{n}\right)+1\right]^2\cdot\left(\frac{3}{n}\right)$
[D.] $\lim_{n\to\infty}\sum_{k=1}^{n}\left[3\left(2+\frac{k}{n}\right)^2+1\right]\cdot\left(\frac{3}{n}\right)$
7
x	2	5	9	15
$f(x)$	10	22	36	28
The function f is continuous on the closed interval [2, 15] and has values as shown in the table above. Using subintervals [2, 5], [5, 9], and [9, 15] what is the approximation of $\int_2^{15} f(x)\,dx$ found by using a right Riemann sum?
[A.] 322
[B.] 345
[C.] 378
[D.] 356
8
If a trapezoidal sum underapproximates $\int_0^4 f(x)dx$ and a right Riemann Sum overapproximates $\int_0^4 f(x)dx$ which of the following could be the graph of $y = f(x)$?
[A.]
[B.]
[C.]
[D.]

Limits of Riemann Sums and Definite Integrals
Task Cards Student Recording Sheet

Name:

1.	**5.**
	6.
	7.
	15.
12.	**16.**

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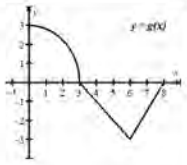
13 Use the graph of $g(x)$ shown at right to find $\int_0^8 g(x)\,dx$



[A.] $\frac{9\pi - 30}{4}$ [B.] $\frac{9\pi - 15}{4}$

[C.] $\frac{9\pi - 15}{2}$ [D.] $\frac{9\pi}{4} - 8$

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14 The table below shows the rate of water flow $w(t)$ through a pipe, in gallons per hour from $0 \le t \le 12$ hours. Estimate the total amount of water that flowed through the pipe, in gallons, for the 12-hour period by using a mid-point Riemann Sum with three sub-intervals.

t (hours)	0	2	4	5	7	9	12
$w(t)$ (gals/hr)	0	6	10	12	14	11	4

[A.] 186 gallons [B.] 348 gallons

[C.] 115 gallons [D.]

15 Write a definite integral for the limit:

$$\lim_{n\to\infty}\sum_{k=1}^{n}\left[2+\sqrt{1+\frac{3k}{n}}\right]$$

[B.] $\sqrt{x}\,)\,dx$

[C.] $\overline{x}\,dx$

PREVIEW



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Jean

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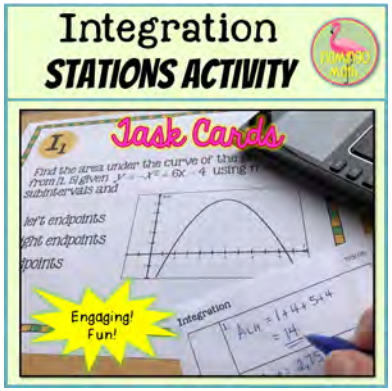



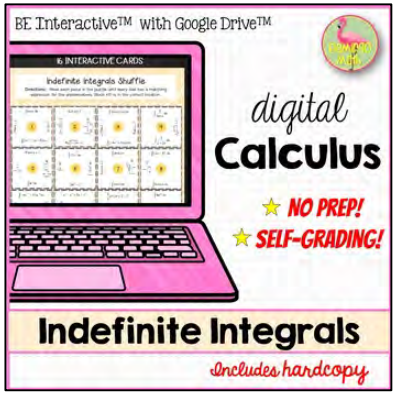

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