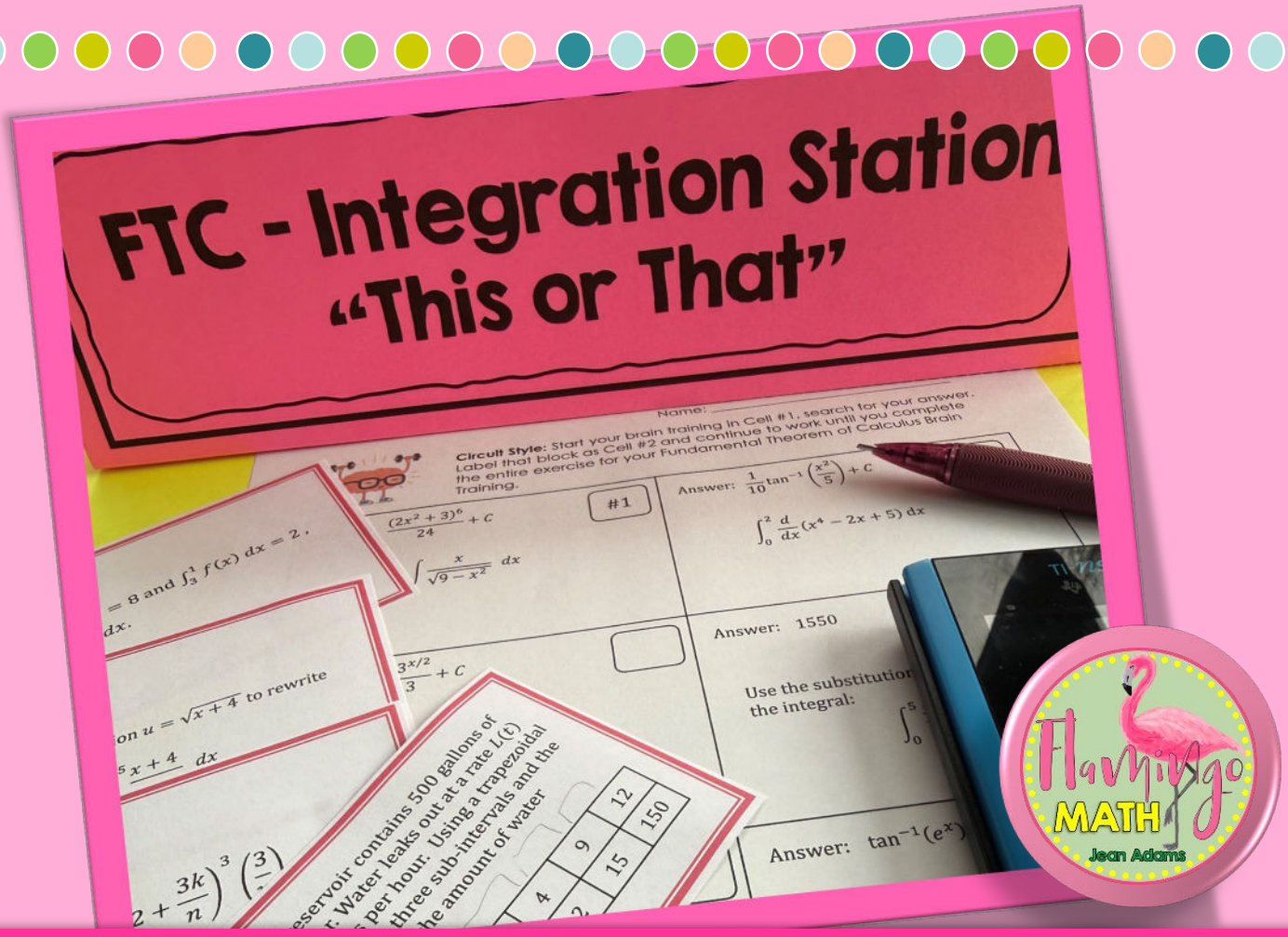
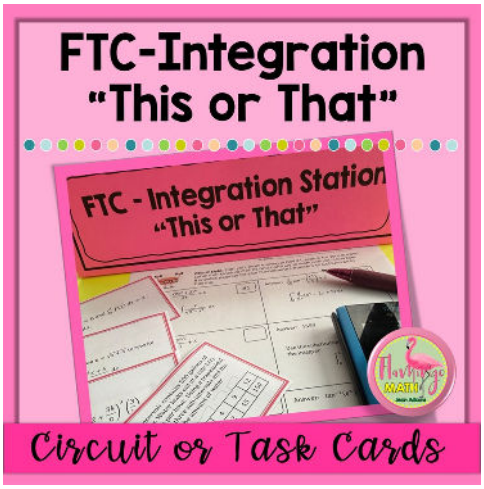
# FTC-Integration "This or That"




## Circuit or Task Cards

# FTC-Integration: This or That




**KEY CONCEPTS/TOPICS:**
★ Find integrals using properties of definite integrals
★ Find indefinite integrals
★ Integrate functions using substitution

**Standards:**

**TOPIC 6.3:** Definite Integral Notation
**TOPIC 6.4:** The Fundamental Theorem of Calculus
**TOPIC 6.6:** Applying Properties of Definite Integrals
**TOPIC 6.7:** Definite Integrals
**TOPIC 6.8:** Finding Antiderivatives and Indefinite Integrals
**TOPIC 6.9:** Integrating Using Substitution

# Product Overview

## FTC-Integration "This or That"

**PREPARATION: Choose which activity to use for this practice set. The questions are different on the two sets. The task cards require supporting work. The circuit activity is self-checking.**

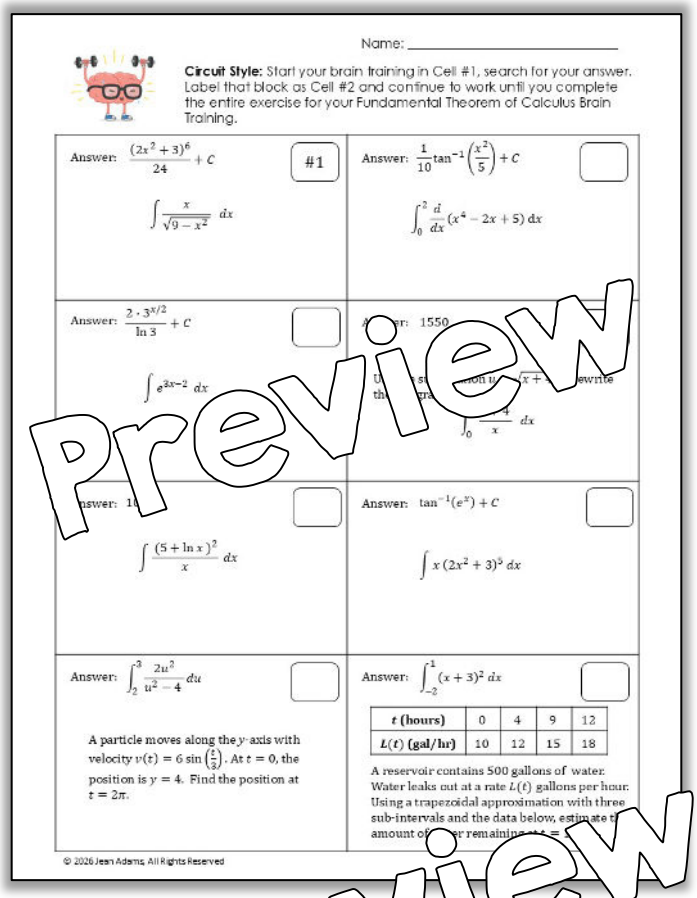
Create the table tent for your station review day.

**"This": Task Cards** Copy a student recording sheet for supporting work, if you want that accountability on the 16 task cards. Copy each set of cards on a card stock, (Task cards 1-16). Cut apart cards and laminate for durability. Place cards in a zipped bag for organization.

**"Or That": Circuit Activity** Copy the 16-question scavenger hunt circuit activity for each student.

**GENERAL DIRECTIONS:**
Students are given a set of 16 cards with an integral to evaluate, or a 16-question Circuit-Style activity. There is a student recording sheet to support work. A table tent is available to use as a station at the end of the year review period.

# "This or That" Activity: Circuit or Task Cards



Name: _____

**Circuit Style:** Start your brain training in Cell #1, search for your answer. Label that block as Cell #2 and continue to work until you complete the entire exercise for your Fundamental Theorem of Calculus Brain Training.

Answer: $\frac{(2x^2+3)^6}{24}+C$ #1

$\int \frac{x}{\sqrt{9-x^2}}\,dx$

Answer: $\frac{1}{10}\tan^{-1}\left(\frac{x^2}{5}\right)+C$

$\int_0^2 \frac{d}{dx}(x^4-2x+5)\,dx$

Answer: $\frac{2\cdot 3^{x/2}}{\ln 3}+C$

$\int e^{3x-2}\,dx$

Answer: 1550

$\int_0^{\ldots} \frac{\ldots 4}{x}\,dx$

Answer: 1…

$\int \frac{(5+\ln x)^2}{x}\,dx$

Answer: $\tan^{-1}(e^x)+C$

$\int x(2x^2+3)^5\,dx$

Answer: $\int_2^3 \frac{2u^2}{u^2-4}\,du$

A particle moves along the $y$-axis with velocity $v(t)=6\sin\left(\frac{t}{3}\right)$. At $t=0$, the position is $y=4$. Find the position at $t=2\pi$.

Answer: $\int_{-2}^{1}(x+3)^2\,dx$

| $t$ (hours) | 0 | 4 | 9 | 12 |
|---|---|---|---|---|
| $L(t)$ (gal/hr) | 10 | 12 | 15 | 18 |

A reservoir contains 500 gallons of water. Water leaks out at a rate $L(t)$ gallons per hour. Using a trapezoidal approximation with three sub-intervals and the data below, estimate the amount of water remaining at $t=$ …

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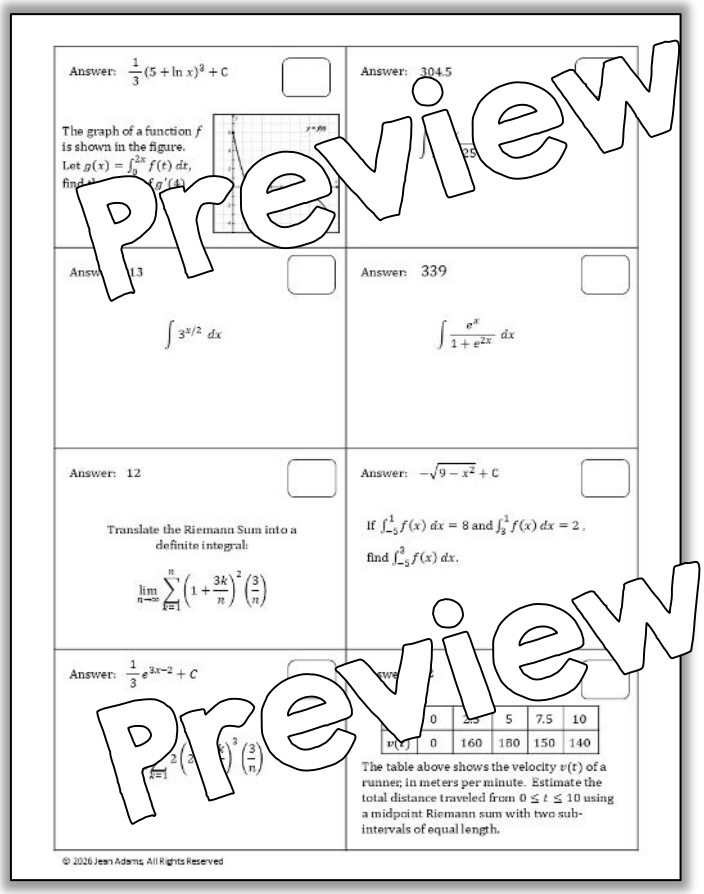

Answer: $\frac{1}{3}(5+\ln x)^3+C$

The graph of a function $f$ is shown in the figure. Let $g(x)=\int_0^{2x} f(t)\,dt$, find the … $f\,g'(4)$

Answer: 304.5

Answer: 13

$\int 3^{x/2}\,dx$

Answer: 339

$\int \frac{e^x}{1+e^{2x}}\,dx$

Answer: 12

Translate the Riemann Sum into a definite integral:

$\lim_{n\to\infty}\sum_{k=1}^{n}\left(1+\frac{3k}{n}\right)^2\left(\frac{3}{n}\right)$

Answer: $-\sqrt{9-x^2}+C$

If $\int_{-5}^{1} f(x)\,dx=8$ and $\int_3^1 f(x)\,dx=2$, find $\int_{-5}^{3} f(x)\,dx$.

Answer: $\frac{1}{3}e^{3x-2}+C$

$\sum_{k=1}^{n} 2\left(2\ldots\right)^3\left(\frac{3}{n}\right)$

Answer: …

| | 0 | 2.5 | 5 | 7.5 | 10 |
|---|---|---|---|---|---|
| $v(t)$ | 0 | 160 | 180 | 150 | 140 |

The table above shows the velocity $v(t)$ of a runner, in meters per minute. Estimate the total distance traveled from $0\le t\le 10$ using a midpoint Riemann sum with two sub-intervals of equal length.

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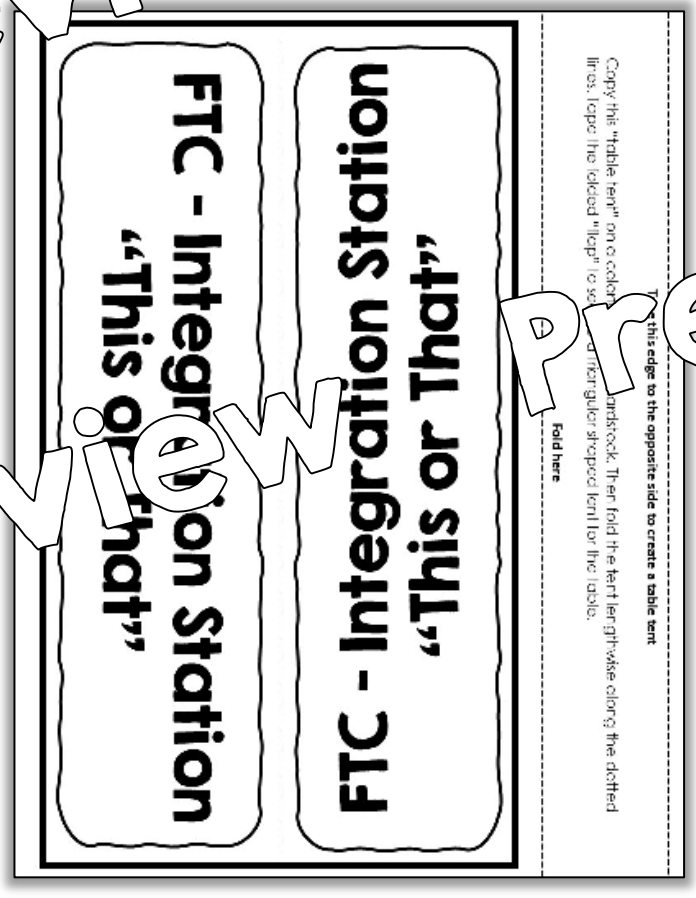


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# "This or That" Activity: Circuit or Task Cards

**1**

$$\int \frac{x}{\sqrt{9-x^2}}\,dx$$

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**2**

If $\int_{-5}^{1} f(x)\,dx = 8$ and $\int_{3}^{1} f(x)\,dx = 2$, find $\int_{-5}^{3} f(x)\,dx$.

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**3**

$$\int \frac{(5+\ln x)^2}{x}\,dx$$

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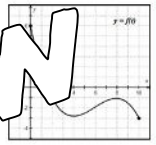
**4**

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**5**

| $t$ | 0 | 2.5 | 5 | 7.5 | 10 |
|---|---|---|---|---|---|
| $v(t)$ | 0 | 160 | 180 | 150 | 140 |

The table above shows the velocity $v(t)$ of a runner, in meters per minute. Estimate the total distance traveled from $0 \le t \le 10$ using a midpoint Riemann sum with two sub-intervals of equal length.

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**6**

Use the substitution $u = \sqrt{x+4}$ to rewrite the integral:

$$\int_{0}^{5} \frac{x+4}{x}\,dx$$

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**7**

A particle moves along the $y$-axis with velocity $v(t) = 6\sin\left(\frac{t}{3}\right)$. At $t = 0$, the position is $y = 4$. Find the position at $t = 2\pi$.

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**8**

$$\int 3^{x/2}\,dx$$

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**9**

$$\int e^{3x-2}\,dx$$

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**10**

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**11**

$$\int \frac{x}{x^4+25}\,dx$$

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**12**

$$\int_{0}^{2} \frac{d}{dx}(x^4 - 2x + 5)\,dx$$

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**13**

Translate the Riemann Sum into a definite integral:

$$\lim_{n\to\infty} \sum_{k=1}^{n} \left(1+\frac{3k}{n}\right)^2 \left(\frac{3}{n}\right)$$

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**14**

A reservoir contains 500 gallons of water. Water leaks out at a rate $L(t)$ gallons per hour. Using a trapezoidal approximation with three sub-intervals and the data below, estimate the amount of water remaining at $t = 12$.

| $t$ (hours) | 0 | 4 | 8 | 12 |
|---|---|---|---|---|
| $L(t)$ (gal/hr) | | | | |

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**15**

$$\int \frac{e^{2x}}{1+e^{2x}}\,dx$$

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**16**

$$\int x\,(2x^2+3)^5\,dx$$

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Name:

Directions: Use the grid to record your answers for the task cards below.

| | |
|---|---|
| 1. | 2. |
| 3. | 4. |
| 5. | 6. |
| 7. | 8. |

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| | |
|---|---|
| 9. | 10. |
| 11. | 12. |
| 13. | 14. |
| 15. | 16. |

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Preview