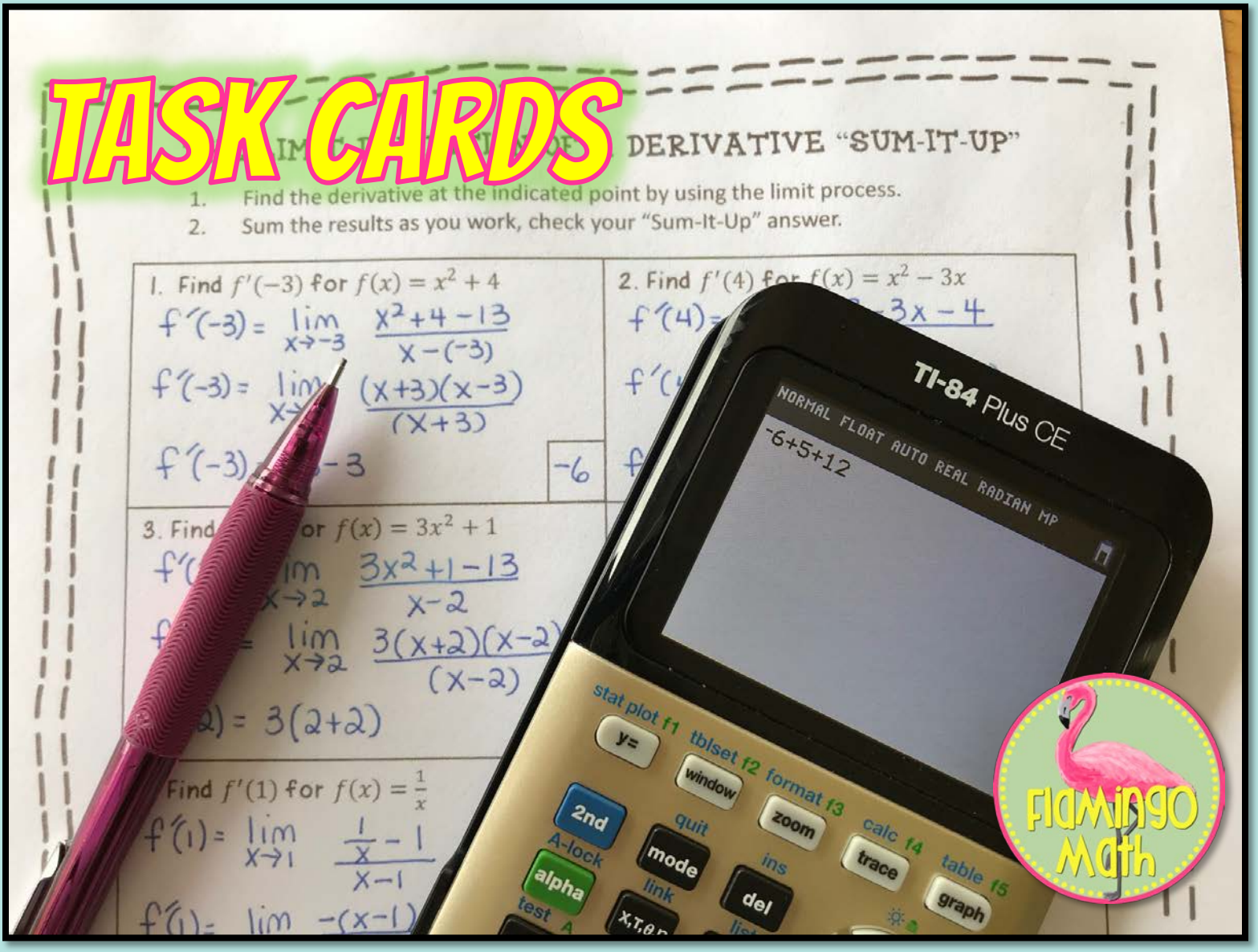
The Limit Definition of a Derivative Sum-It-Up



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The Limit Definition of a Derivative Sum-It-Up Activity

In this Sum-It-Up Activity, your PreCalculus students will use the formal definition of a derivative to find the derivative of a function at a point. This activity is as a review for the unit on ***Intro to Calculus***. There are 10 functions in the activity.

Using the activity:
Students find the answer to each of the 10 questions and add or subtract as they go along to "Sum-It-Up" for a grand total at the end. A Giant QR-Code is included if you like to use technology.

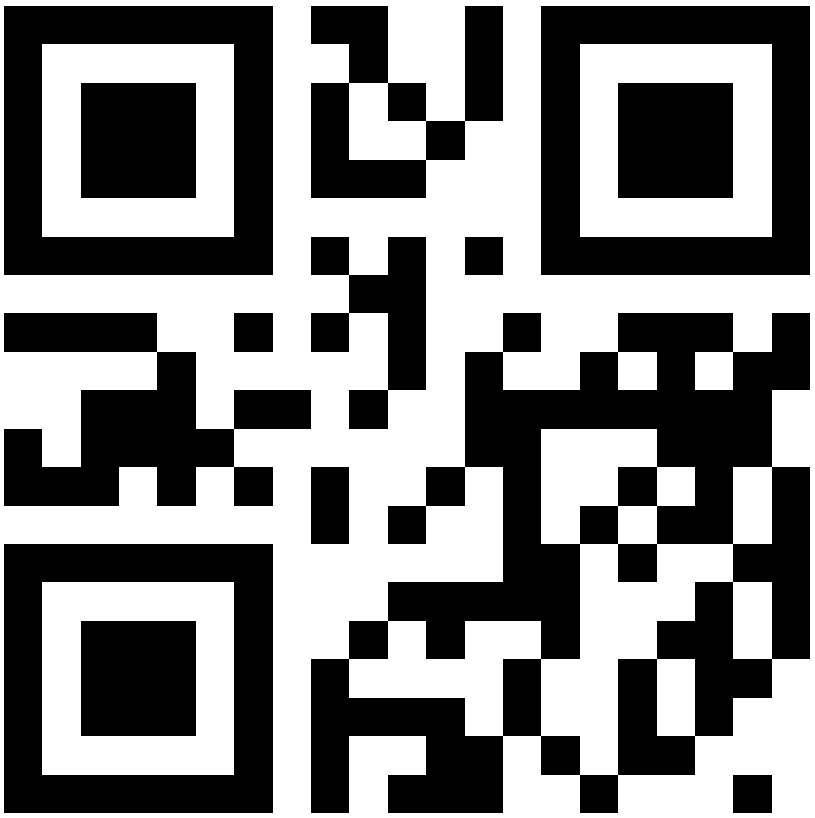
The activity can be done independently, as a pair and share, or many other strategies, including a race.

The Limit Definition of a Derivative "Sum-It-Up"

1. Find the derivative at the indicated point by using the limit process.
2. Sum the results as you work, check your "Sum-It-Up" answer.

1. Find $f'(-3)$ for $f(x) = x^2 + 4$	2. Find $f'(4)$ for $f(x) = x^2 - 3x$
3. Find $f'(2)$ for $f(x) = 3x^2 + 1$	4. Find $f'(-2)$ for $f(x) = 4x - x^2$
5. Find $f'(1)$ for $f(x) = \frac{1}{x}$	6. Find $f'(-3)$ for $f(x) = x^2 + 2x - 3$
7. Find $f'(-1)$ for $f(x) = x^2 - 3x - 2$	8. Find $f'(5)$ for $f(x) = \sqrt{x-1}$
9. Find $f'(3)$ for $f(x) = x^3$	10. Find $f'(-1)$ for $f(x) = \frac{1}{x^2}$

Sum-It-Up Total :



The Limit Definition of a Derivative
Sum-It-Up Activity

THE LIMIT DEFINITION OF A DERIVATIVE "SUM-IT-UP"

1. Find the derivative at the indicated point by using the limit process.
2. Sum the results as you work, check your "Sum-It-Up" answer.

1. Find $f'(-3)$ for $f(x) = x^2 + 4$

$f'(-3) = \lim_{x \to -3} \frac{x^2+4-13}{x-(-3)}$

$f'(-3) = \lim_{x \to -3} \frac{(x+3)(x-3)}{(x+3)}$

$f'(-3) = -3-3$ **-6**

2. Find $f'(4)$ for $f(x) = x^2 - 3x$

$f'(4) = \lim_{x \to 4} \frac{x^2-3x-4}{x-4}$

$f'(4) = \lim_{x \to 4} \frac{(x+1)(x-4)}{(x-4)}$

$f'(4) = 4+1$ **5**

3. Find $f'(2)$ for $f(x) = 3x^2 + 1$

$f'(2) = \lim_{x \to 2} \frac{3x^2+1-13}{x-2}$

$f'(2) = \lim_{x \to 2} \frac{3(x+2)(x-2)}{(x-2)}$

$f'(2) = 3(2+2)$ **12**

4. Find $f'(-2)$ for $f(x) = 4x - x^2$

$f'(-2) = \lim_{x \to -2} \frac{4x-x^2-(-12)}{x-(-2)}$

$f'(-2) = \lim_{x \to -2} \frac{(2+x)(6-x)}{(x+2)}$

$f'(-2) = 6-(-2)$ **8**

5. Find $f'(1)$ for $f(x) = \frac{1}{x}$

$f'(1) = \lim_{x \to 1} \frac{\frac{1}{x}-1}{x-1}$

$f'(1) = \lim_{x \to 1} \frac{-(x-1)}{x(x-1)}$

$f'(1) = -\frac{1}{1}$ **-1**

6. Find $f'(-3)$ for $f(x) = x^2 + 2x - 3$

$f'(-3) = \lim_{x \to -3} \frac{x^2+2x-3-0}{x-(-3)}$

$f'(-3) = \lim_{x \to -3} \frac{(x+3)(x-1)}{(x+3)}$

$f'(-3) = -3-1$ **-4**

7. Find $f'(-1)$ for $f(x) = x^2 - 3x - 2$

$f'(-1) = \lim_{x \to -1} \frac{x^2-3x-2-2}{x-(-1)}$

$f'(-1) = \lim_{x \to -1} \frac{(x-4)(x+1)}{x+1}$

$f'(-1) = -1-4$ **-5**

8. Find $f'(5)$ for $f(x) = \sqrt{x-1}$

$f'(5) = \lim_{x \to 5} \frac{\sqrt{x-1}-2}{x-5}$

$f'(5) = \lim_{x \to 5} \frac{(x-5)}{(x-5)(\sqrt{x-1}+2)}$

$f'(5) = \frac{1}{\sqrt{5-1}+2}$ **$\frac{1}{4}$**

9. Find $f'(3)$ for $f(x) = x^3$

$f'(3) = \lim_{x \to 3} \frac{x^3-27}{x-3}$

$f'(3) = \lim_{x \to 3} \frac{(x-3)(x^2+3x+9)}{(x-3)}$

$f'(3) = 3^2+3(3)+9$ **27**

10. Find $f'(-1)$ for $f(x) = \frac{1}{x^2}$

$f'(-1) = \lim_{x \to -1} \frac{\frac{1}{x^2}-1}{x-(-1)}$

$f'(-1) = \lim_{x \to -1} \frac{(1+x)(1-x)}{x^2} \cdot \frac{1}{(x+1)}$

$f'(-1) = \frac{1-(-1)}{1^2}$ **2**

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