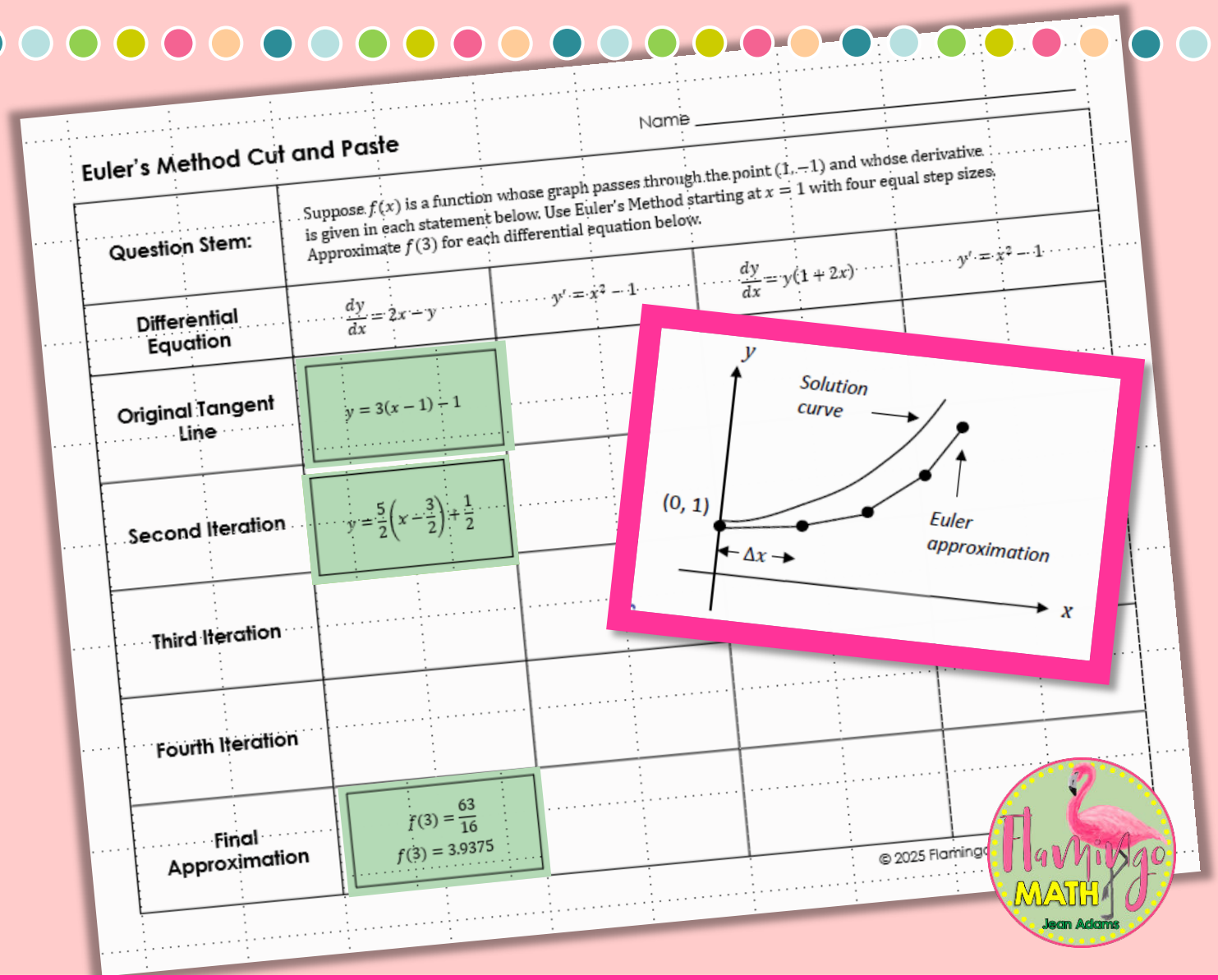
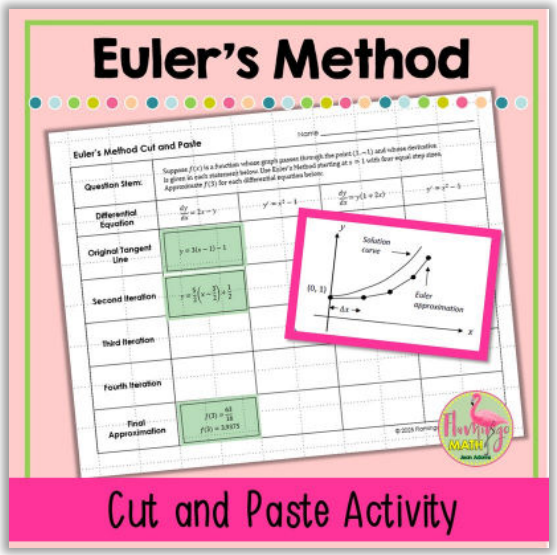
Euler's Method



Cut and Paste Activity

Euler's Method Cut and Paste Activity



KEY CONCEPTS/TOPICS:

1. Estimate solutions to differential equations.
2. Use Euler's method for approximating a solution to a differential equation or a point on a solution curve.

GENERAL DIRECTIONS:

This is a cut-and-paste activity for practicing Euler's Method in AP Calculus BC.

Product Overview

Euler's Method Cut-and-Paste Activity

Here's a great activity to reinforce **computational accuracy using Euler's Method.** There are four differential equations with the same initial point at $(1, -1)$ that asks for an approximation for $f(3)$.
This is intentional to keep your students working and thinking throughout the exercises. A student "worksheet" is provided to help their computations and give accountability for individual or group work.

Copy the student sorting mat, student worksheet for students. Copy the equation cards and laminate on different colors of card stock to keep the sets together. An answer key is included.

College Board® Topics:

Topic 7.5: Approximating Solutions Using Euler's Method (BC Only)
FUN-7.C.4: Euler's method provides a procedure for approximating a solution to a differential equation or a point on a solution curve. **BC ONLY**

Teacher Directions: Run a copy of the tangent line iteration cards on card stock, laminate and cut apart. It is helpful to create sets by using different colors of cardstock in order to identify complete sets when students work in cooperative groups. Store the cards in a zipped storage bag.

A $y = -\frac{27}{2}(x-2) - \frac{9}{2}$	**B** $f(3) = -\frac{495}{16}$ $f(3) = -30.9375$	**C** $y = -1$	**D** $y = -\frac{315}{8}\left(x - \frac{5}{2}\right) - \frac{45}{4}$
E $y = \frac{21}{4}\left(x - \frac{5}{2}\right) + \frac{9}{8}$	**F** $y = \frac{5}{2}\left(x - \frac{3}{2}\right) + \frac{1}{2}$	**G** $y = -1$	**H** $y = -1\left(x - \frac{3}{2}\right) - \frac{1}{2}$
J $y = 1(x-1) - 1$	**K** $y = -\frac{1}{2}\left(x - \frac{5}{2}\right) - 1$	**L** $f(3) = -\frac{5}{4}$ $f(3) = -1.25$	**M** $y = \frac{9}{4}(x-2) + \frac{7}{4}$
N $f(3) = \frac{63}{16}$ $f(3) = 3.9375$	**O** $y = 3(x-1) - 1$	**P** $y = 3(x-2) - \frac{3}{8}$	**Q** $f(3) = \frac{15}{4}$ $f(3) = 3.75$
R $y = -5\left(x - \frac{3}{2}\right) - 2$			

Euler's Method Cut and Paste Name _____

Question Stem:	Suppose $f(x)$ is a function whose graph passes through the point $(1, -1)$ and whose d is given in each statement below. Use Euler's Method starting at $x = 1$ with four equal Approximate $f(3)$ for each differential equation below.			
Differential Equation	$\frac{dy}{dx} = 2x - y$	$y' = x^2 - 1$	$\frac{dy}{dx} = y(1+x)$	
Original Tangent Line				
Second Iteration				
Third Iteration				
Fourth Iteration				
Final Approximation				

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Euler's Method Name _____

	(x, y)	dy	New y	*Tangent Line*
P_0	$(1, -1)$			
P_1				
P_2				
P_3				

	(x, y)	dy	New y	*Tangent Line*
P_0	$(1, -1)$			
P_1				
P_2				
P_3				

	(x, y)	dy	New y	*Tangent Line*
P_0	$(1, -1)$			
P_1				
P_2				
P_3				

	(x, y)	dy	New y	*Tangent Line*
P_0	$(1, -1)$			
P_1				
P_2				
P_3				

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