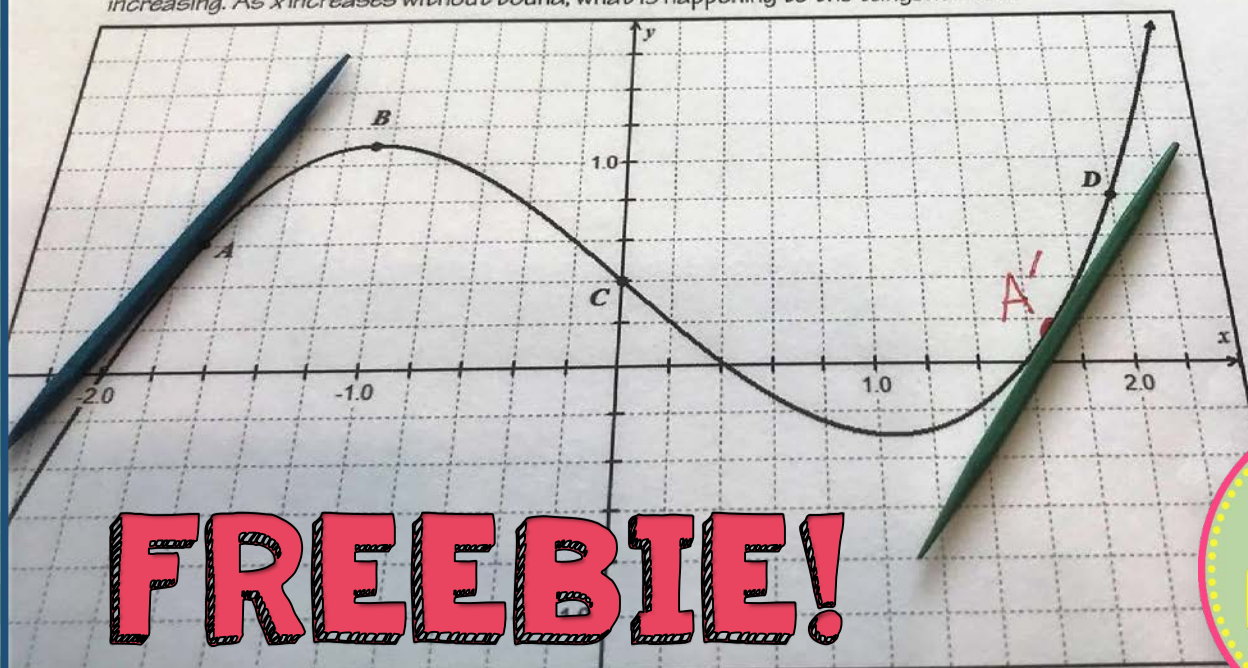TOOTHPICKS ON A TANGENT!

Grab a to... ...to make an estimate of the slope of the tangent line (I.R.O.C.) at the given points on each graph. Then ...wer the questions related to each function.

1.) Find another point on the graph where the tangent line has the same slope as A. Label this point as A'. (A prime). Do this for every point, if possible. Describe the intervals where the rates of change are increasing. As x increases without bound, what is happening to the tangent lines?

FREEBIE!

Flamingo Math

Toothpicks on a Tangent Line Activity

FLAMINGO MATH

TOOTHPICKS ON A TANGENT LINE ACTIVITY

Use this activity as an introduction to **Equations of Tangent Lines** lesson. The concepts will help your students get a graphical understanding of the derivative as an instantaneous rate of change at a given point.

Lesson Objectives:
- Students will use either toothpicks or uncooked spaghetti noodles to find both average rates of change and instantaneous rates of change.

Teaching Suggestions:
- Use the set as a group activity for 2-4 students per group.
- Use the cards as a review activity prior to assessing students.

You may be interested in purchasing the guided notes and SMART Board Presentation for this lesson at Equations of Tangent Lines.

Toothpicks on a Tangent Line!

Grab a toothpick and use it to make an estimate of the slope of the tangent line (I.R.O.C.) at the given points on each graph. Then answer the questions related to each function.

1.) Find another point on the graph where the tangent line has the same slope as A. Label this point as A', (A prime). Do this for every point, if possible. Describe the intervals where the rates of change are increasing. As x increases without bound, what is happening to the tangent lines?
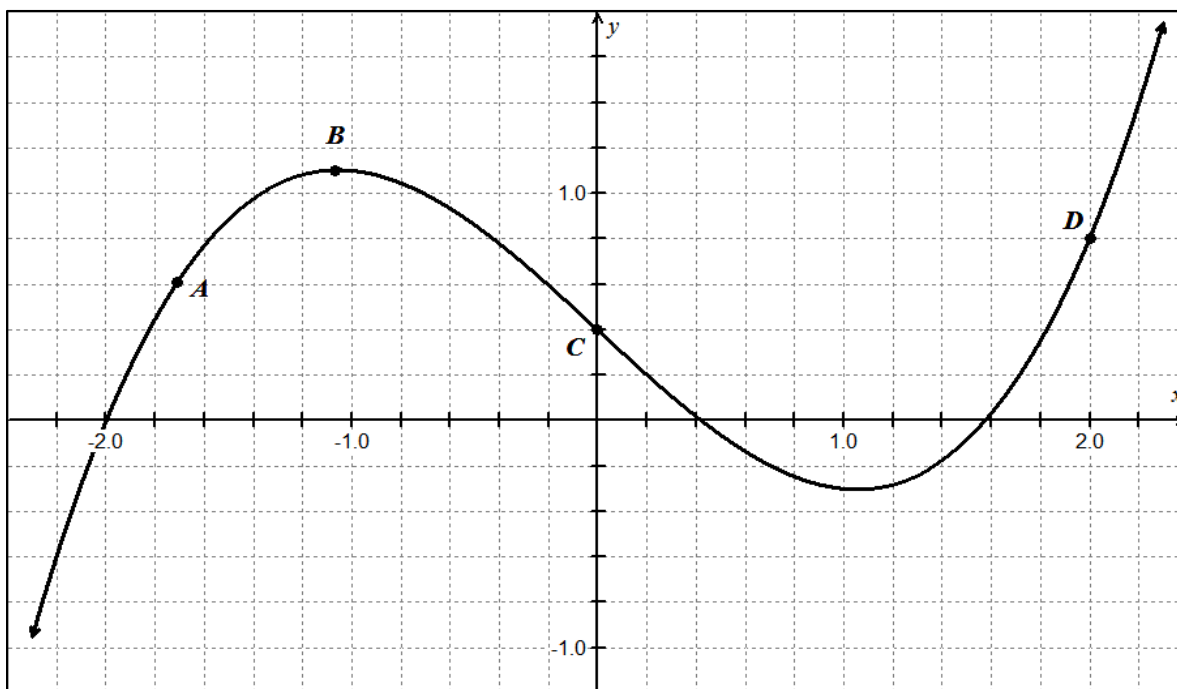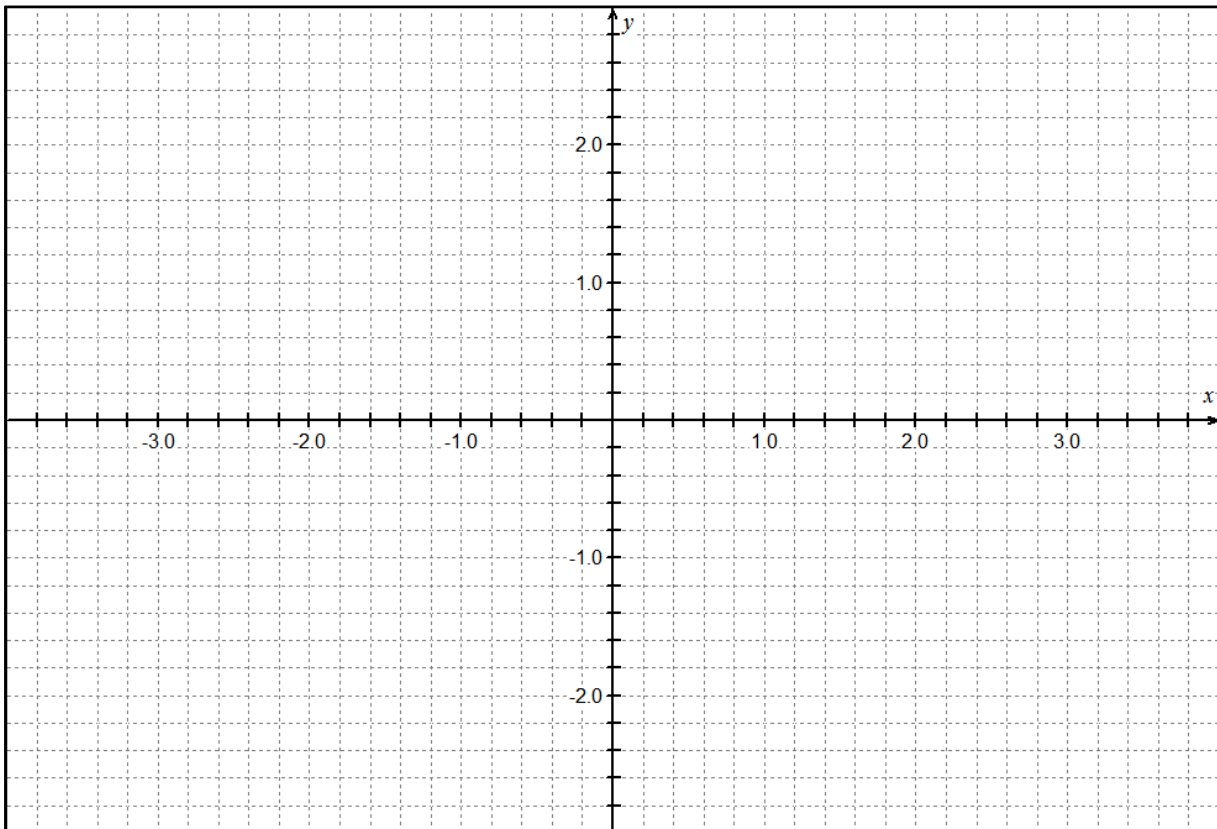

2.) Use your knowledge of limits to justify your instantaneous rate of change at point B.
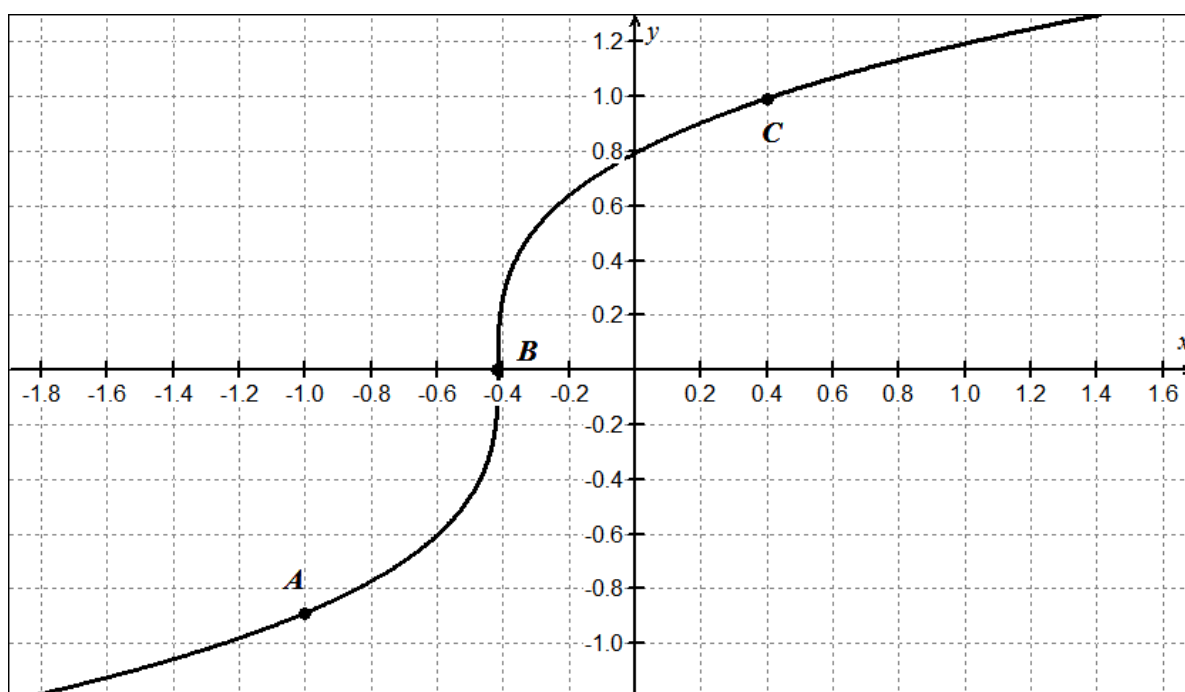
3.)   Describe the behavior of the rates of change at points A and B. (increasing, decreasing, fast, slow.)   Explain what occurs at point C.
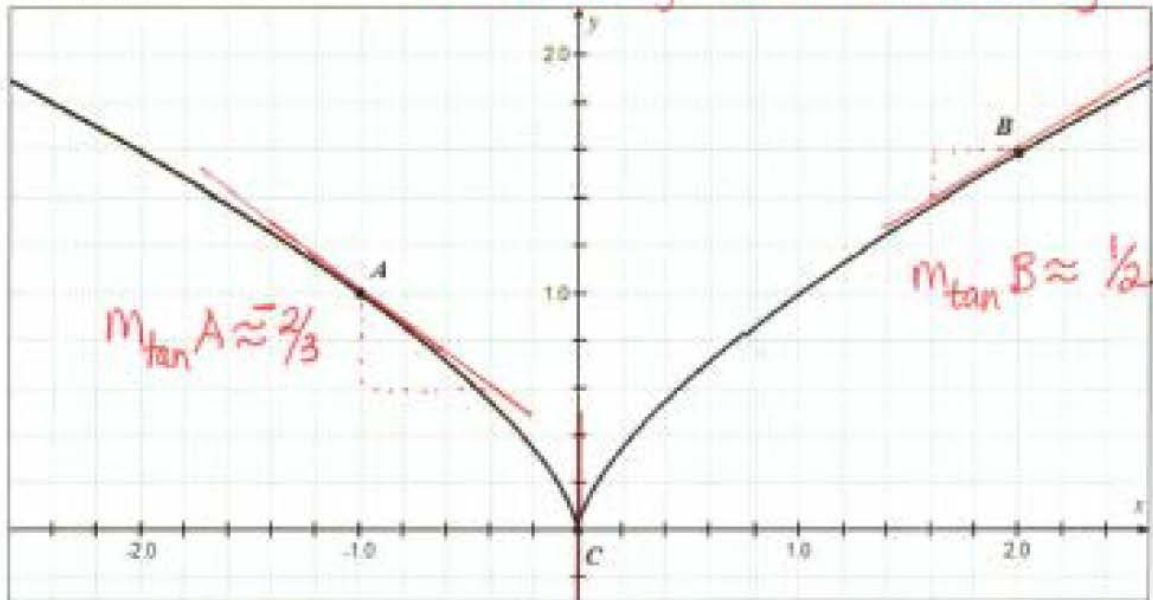

4.)   Sketch a function with the given conditions. At Point A : $m_{tan}\, A > 0$; at Point B : $m_{tan}B = 0$; at Point C : $m_{tan}C < 0$. At Point D : $m_{tan}D$ is vertical.

TOOTHPICKS ON A TANGENT!

Grab a toothpick and use it to make an estimate of the slope of the tangent line (I.R.O.C.) at the given points on each graph. Then answer the questions related to each function.

1.) Find another point on the graph where the tangent line has the same slope as A. Label this point as A' (A prime). Do this for every point, if possible. Describe the intervals where the rates of change are increasing. As x increases without bound, what is happening to the tangent lines?

$(-1.4, 1.2)$ B $m_{tan} B = 0$

$(2.2, 1.2)$

D

$(2, .8)$

$m_{tan} C = -1$

A' $m_{tan} D = 2$

$(-2, .2)$ $m_{tan} A \approx \frac{5}{3}$

D' C'

B'

$x \to B^+ \quad y \to \infty \qquad x \to B^- \quad y \to \infty$

2.) Use your knowledge of limits to justify your instantaneous rate of change at point B.

C $m_{tan} C \approx \frac{1}{2}$

$m_{tan} B$ dne B
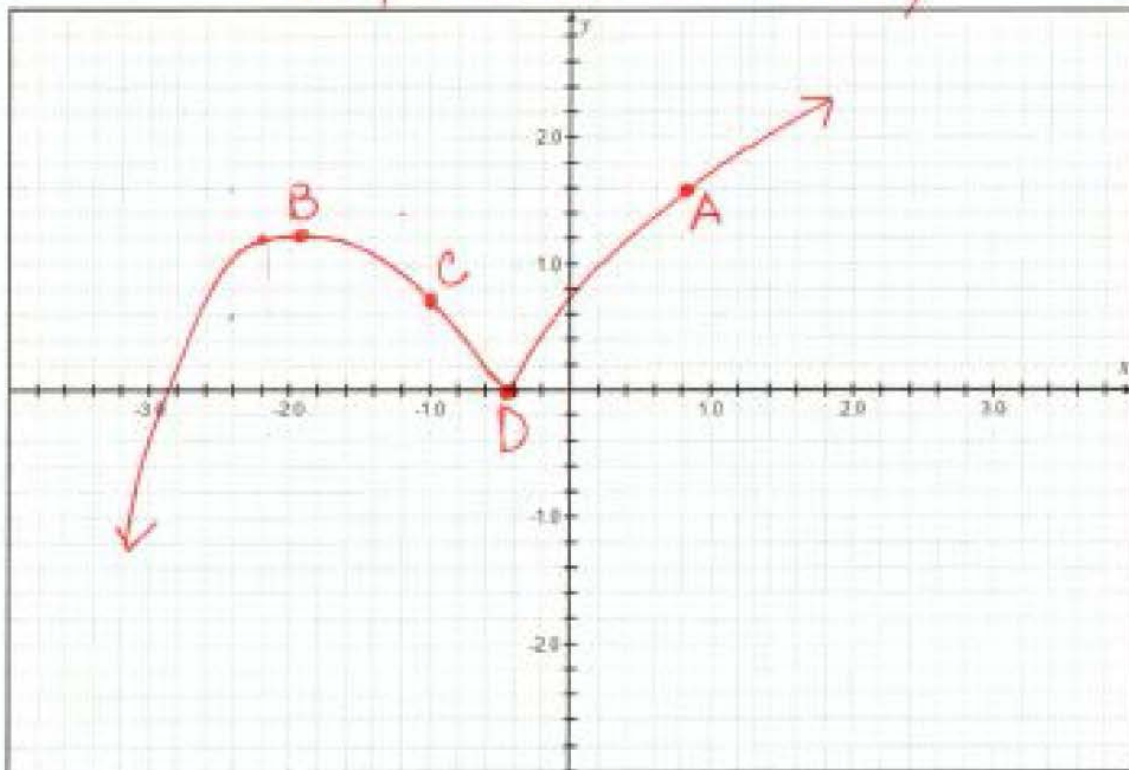
A

$m_{tan} A \approx \frac{1}{2}$
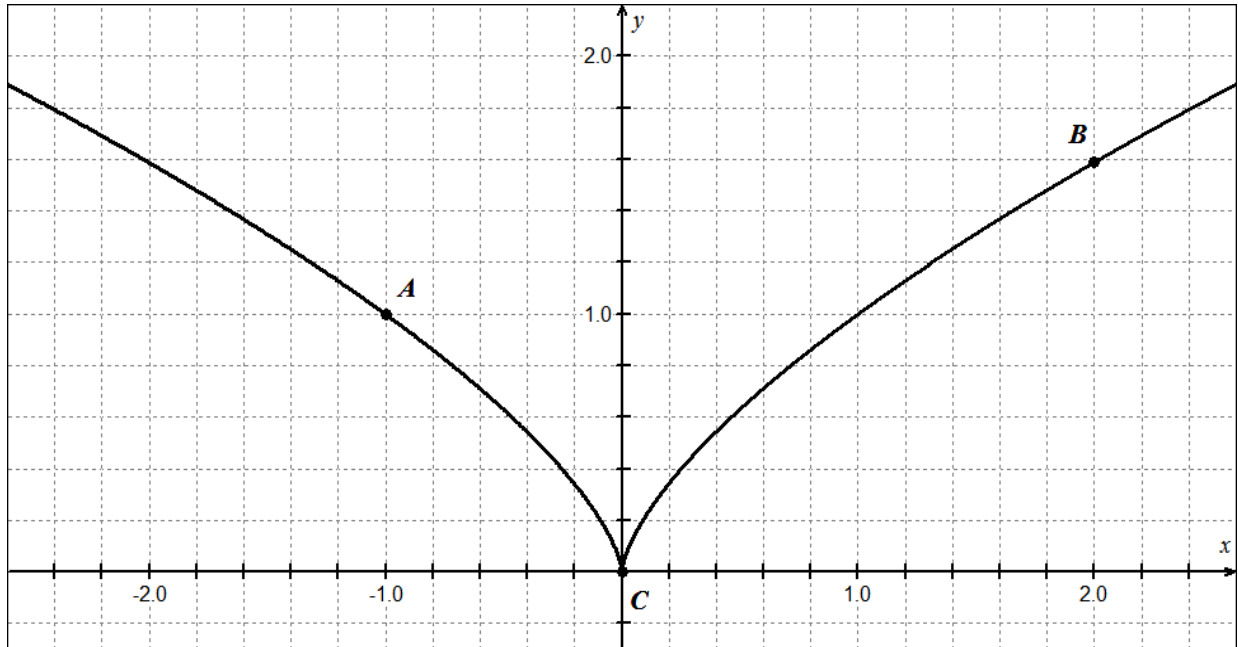
3.) Describe the behavior of the rates of change at points A and B (increasing, decreasing, fast, slow.) Explain what occurs at point C. **A: decreasing faster   B: increasing slowly**

$m_{tan} A \approx ^-2/3$

$m_{tan} B \approx 1/2$

4.) Sketch a function with the given conditions. At Point A: $m_{tan} A > 0$; at Point B: $m_{tan} B = 0$; at Point C: $m_{tan} C < 0$. At Point D: $m_{tan} D$ is vertical.

Graph answer will vary.

FLAMINGO MATH

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Algebra 2, Pre-Calculus, and Calculus.

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