

AP[®] Calculus

Function Analysis Digital Activity



Let $f(x)$ be the continuous function defined on $[-6, 6]$ whose graph consists of a semi-circle and three line segments, as shown at right.

Let k be the function given by $k(x) = -2 + \int_0^x f(t) dt$ such that $k(0) = -2$.

A) Find $k(-6)$

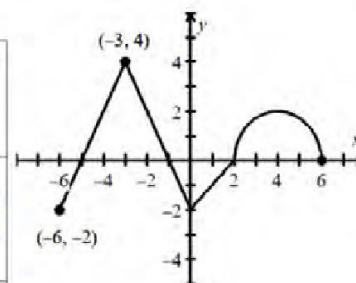
Answer:

B) At what value(s) of x on $-6 < x < 6$ is the graph of $k(x)$ increasing? Justify your answer.

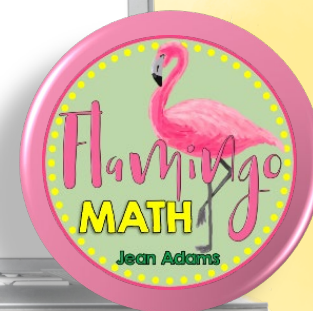
Answer:

C) Write an equation for the line tangent to the graph of k at $x = -3$

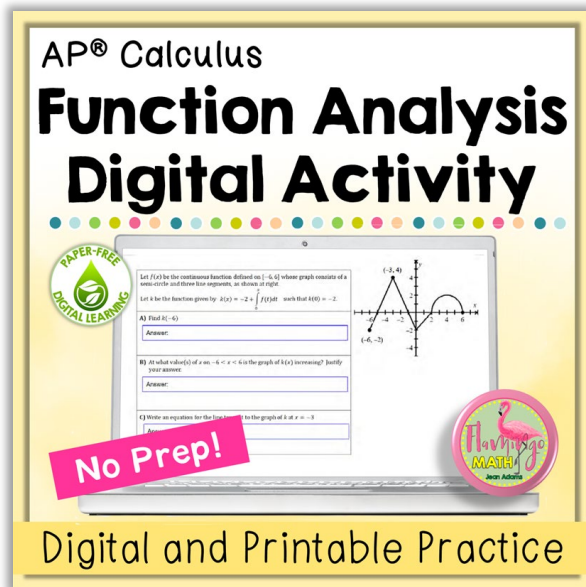
Answer:



No Prep!



Digital and Printable Practice



Function Analysis & Accumulation Activity with Google Slides™

Your AP Calculus AB & BC students will have 3 questions related to Function Analysis & Accumulation which can be used as a class assignment, a distance learning activity or as a group assessment.

QUESTION STEMS:

1. Analyze a derivative graph to find behavior of the function and justify your answer. This is a drag and drop activity.
2. Given the graph of a velocity function, find the time for greatest speed, acceleration, particle movement, intervals where speed decreases, total distance traveled and position of the particle at a specified time.
3. Given the graph of a derivative function and the definition of the function as an integral, find where function is increasing, write the tangent line at a point, find absolute extrema and points of inflection with justifications for your answers.

NOTE: You and your students must have a free Google account in order to access and interact with the activity. It is not necessary to use Google Classroom to use this resource.

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Function Analysis & Accumulation

DIGITAL ACTIVITY



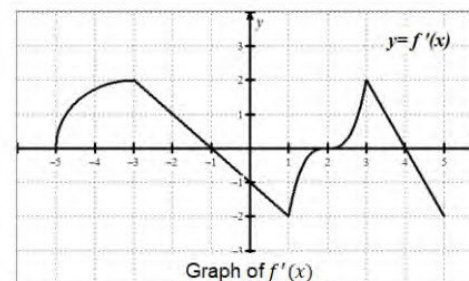
Directions:

1. There are three questions in the activity on 5 slides.
2. Question #1 is a drag and drop set. You will use the derivative graph to find behavior of the function. Move the boxes with the correct answer into the first column. Then, find the justification for your answer and move the correct justification into the column that corresponds to your answer.
3. Question #2 has 6 prompts [A-F] on 2 slides. There is a text box for you to type your answer or insert a photo image of your work.
4. Question #3 has 5 prompts [A-E] on 2 slides. There is a text box for you to type your answer or insert a photo image of your work.
5. Your teacher will give directions.

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Let $f(x)$ be a function that is continuous on $[-5, 5]$, whose derivative is shown at right. Find the location(s)/interval(s) of the function described below. $f'(x)$ has a horizontal tangent line at $x = 2$.

Behavior	Location(s)/Interval(s)	Justification
$f(x)$ has a local maximum	$f'(x) = 0$	$f'(x)$ changes from negative to positive
$f(x)$ has a local minimum	$x = 2$	$x = -1$
$f(x)$ is increasing		
$f(x)$ is decreasing	$f'(x)$ changes from positive to negative	$(-5, -1)$ and $(2, 4)$
$f(x)$ is concave up	$x = 1$	$(-3, 1)$ and $(3, 5)$
$f(x)$ is concave down	$f'(x)$ is decreasing	$f'(x)$ is negative $f'(x) < 0$
$f(x)$ has a point of inflection		



$f'(x)$ changes from negative to positive

The graph goes negative to positive

$f'(x)$ is increasing

$f'(x)$ changes from increasing to decreasing to increasing

$x = -3$

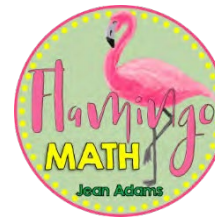
$(-5, -1)$ and

$x = \{-1, 4\}$

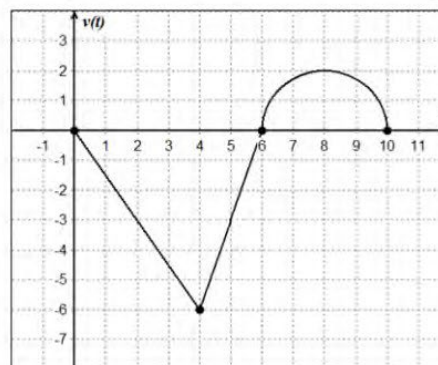
$x = \{-3, 1\}$

$(-5, -3)$ and $(1, 3)$

$f'(x)$ is positive
 $f'(x) > 0$



The graph above shows the velocity $v(t)$, of a particle moving along the x -axis for $0 \leq t \leq 10$. It consists of a semicircle and two line segments. Use the graph to answer the following questions.



A) At what time t , $0 \leq t \leq 10$, is the speed of the particle the greatest?

Answer:

B) At which of the times, $t = 2$, $t = 5$, or $t = 8$, is the acceleration of the particle the greatest? Explain your answer.

Answer:

C) Over what time intervals is the particle moving in the positive direction?

Answer:

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A) Find $k(-6)$

Answer:

B) At what value(s) of x on $-6 < x < 6$ is the graph of $k(x)$ increasing? Justify your answer.

Answer:

C) Write an equation for the line tangent to the graph of k at $x = -3$

Answer:

