

Classwork 24

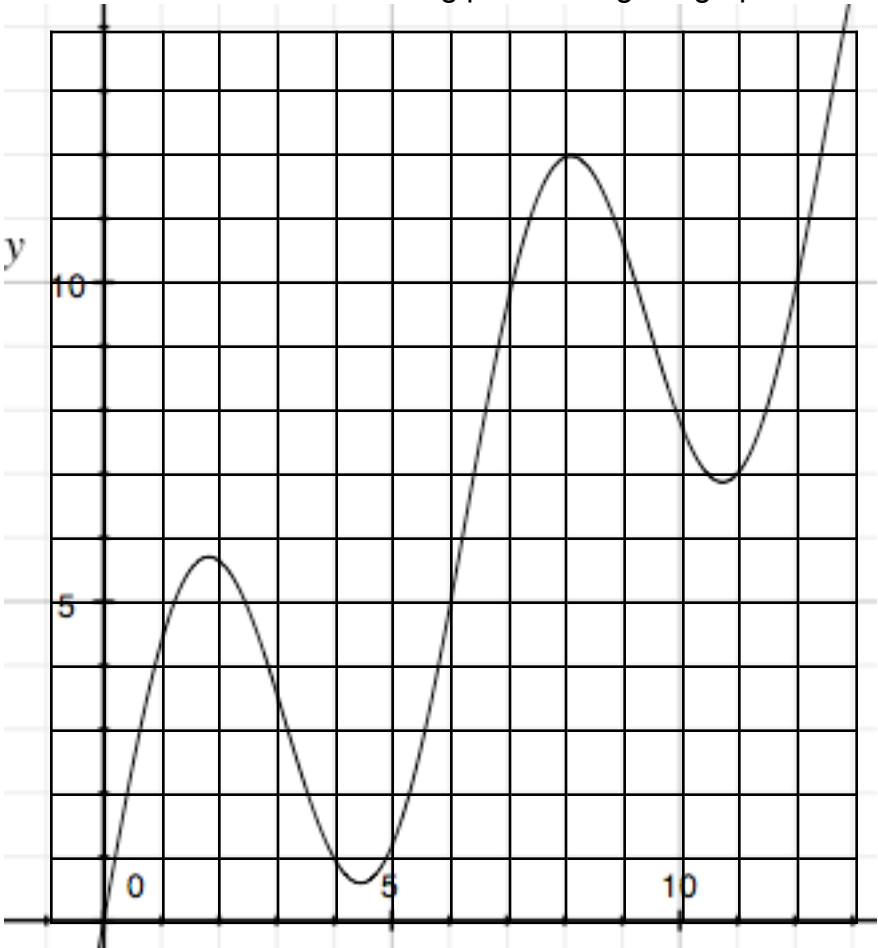
1. Describe two ways of approximating the instantaneous speed or exact slope of a curve.

2. a. Approximate the exact slope of the curve below at the following points using the graph:

i. $x = 1$

ii. $x = 5$

iii. $x = 10$



The equation of this graph is
 $y = x + 4 \sin x$

b. Use the chart below to approximate the exact slope at $x = 1$.

First point		Second point		Δx	Δy	slope
x	y	x	y			
1		2				
1		1.7				
1		1.2				
1		1.1				
1		1.01				
1		1.001				

I think the exact slope is around:

c) Use the chart to approximate the exact slope at $x = 5$.

First point		Second point		Δx	Δy	slope
x	y	x	y			
5		6				
5		5.5				
5		5.1				
5						
5						
5						

I think the exact slope is around:

d) Approximate the slope at $x = 10$ by using a series of points near $x = 10$.

First point		Second point		Δx	Δy	slope
x	y	x	y			
10						

I think the exact slope is around:

3. Let's say we are dealing with the graph of $f(x) = \frac{\frac{1}{3}x^4 - 5x^2 + 1}{x^2 + 2x + 4}$

a) Investigate the slope around $x = 1$ using a chart.

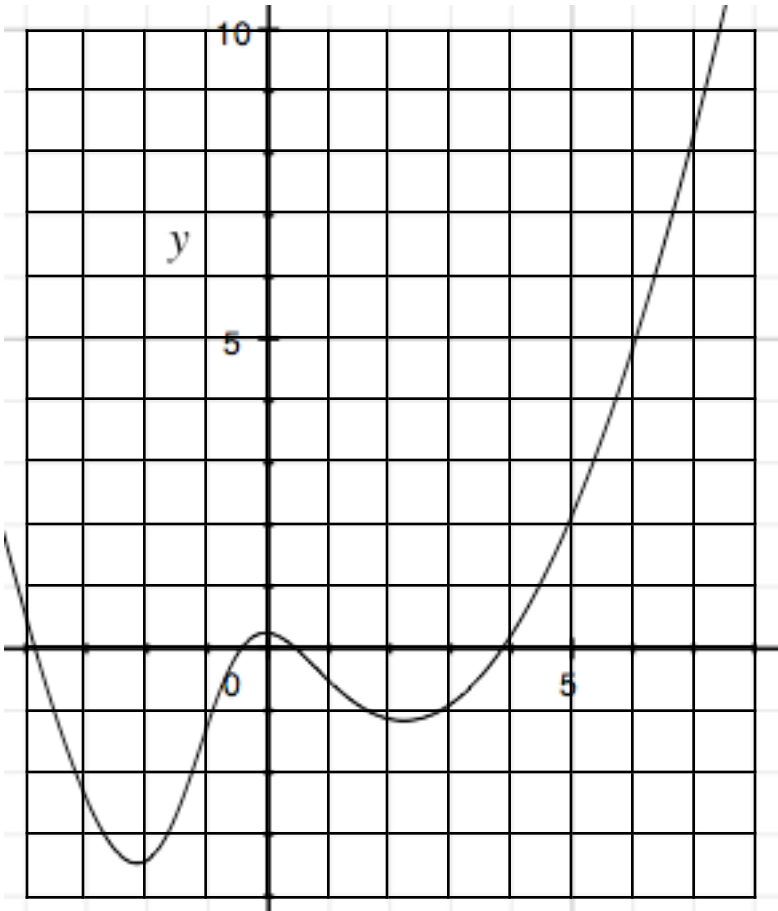
First point		Second point		Δx "h"	$\Delta f(x)$	slope
x	f(x)	x	f(x)			

b) Investigate the slope around $x = 5$ using the chart. This time, however, Δx is given.

First point		Second point		Δx "h"	$\Delta f(x)$	slope
5				.8		
				.2		
				.05		
				.001		
So in general, in terms of only x , h , and $f(x)$						
x						

c) Use the graph to check your answers

d) Write a limit to express the exact slope at a point x .



4. Label the drawing to show where each expression below goes (and what it represents).

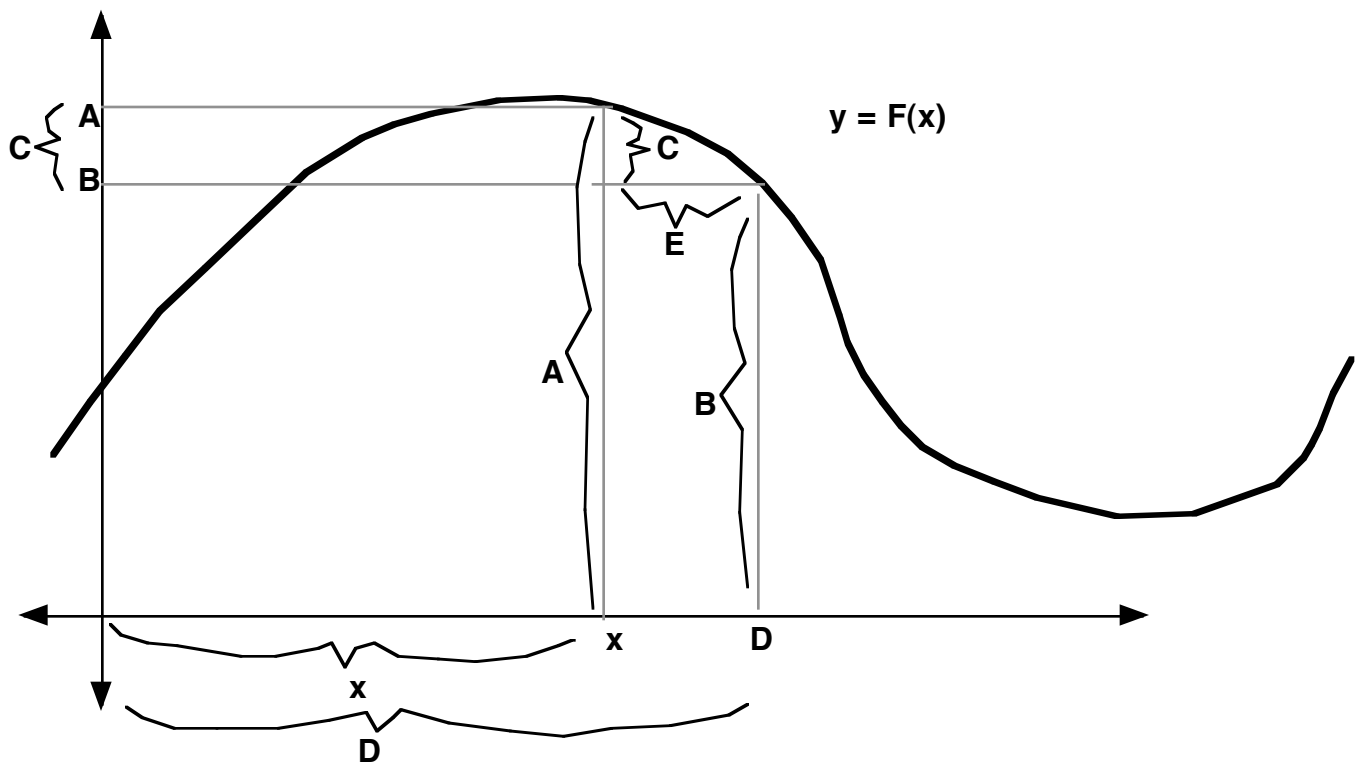
1. $F(x)$

2. h

3. $F(x + h)$

4. $x + h$

5. $F(x + h) - F(x)$



Practice Problem

1. Use a small Δx near the point given to find the approximate slope.

a) $f(x) = 3x - 2$ $x = 2$

b) $f(x) = x^2 - 4x + 1$ $x = 3$

c) $f(x) = \sin x$ $x = 5$