

Name: _____

AP

Classwork 26

1. a. Let $f(x) = x^2$. Find $f(x + h)$.

b. Let $f(x) = x^3$. Find $f(x + h)$

c. Let $f(x) = 3x + 1$. Find $f(x + h)$.

d. Let $f(x) = x^2 - x$. Find $f(x + 3)$

2. 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 $x = 5$ using the chart. This time, however, Δx is given.

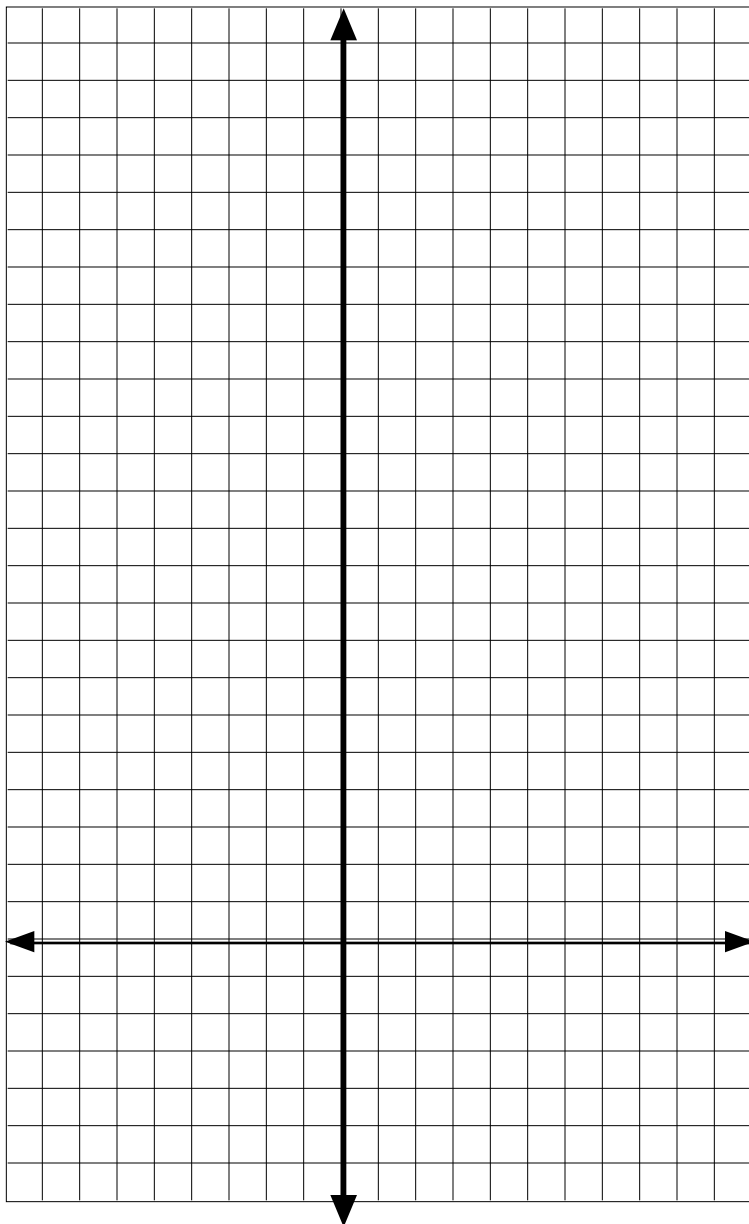
First point		Second point		Δx “h”	$\Delta f(x)$	slope
5				.8		
				.2		
				.1		
				.05		
				.001		

So in general, in terms of only x , h , and $f(x)$

(A)	(B)	(C)	(D)	(E)	(F)	(G)
x						
First point		Second point		Δx “h”	$\Delta f(x)$	slope

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

3. a) Graph $y = x^2$ on the graph below and fill out the table.

[illegible]

b) How much does y increase by every time x goes up by 1?

c) Write a formula for that increase.

d) Let the first y value be x_1 . Prove your regularity mathematically.

e) Use the second chart for the function $y = x^2 + 2x - 6$ and then **graph it on the same axes**. Does the same pattern hold?

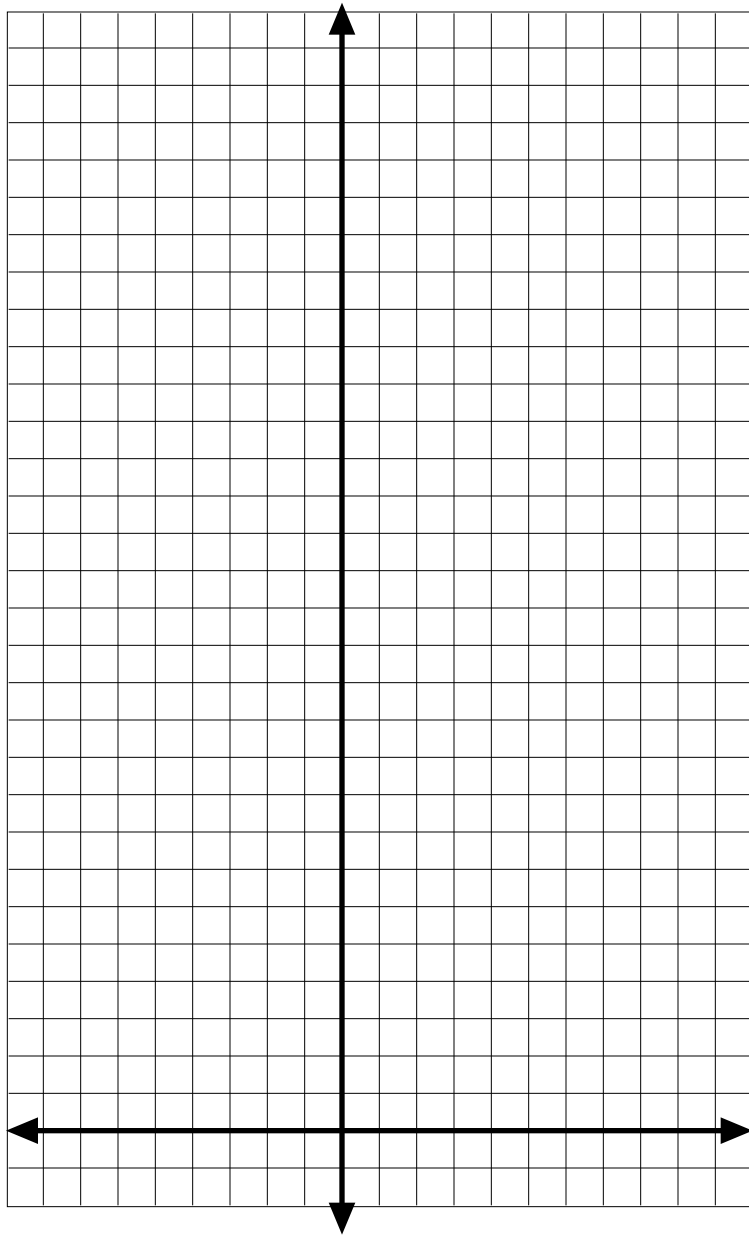
4. a) Graph $y = 2x^2$ and $y = 2x^2 - 4x + 1$ on the graph below.

b) How much does y increase every time x increases by 1?

c) Prove mathematically that this regularity is true.

d) What pattern do you predict for parabolas that start with $3x^2$?

e) What pattern do you predict for cx^2 ? Can you prove it?



f) Discuss how slope changes in a parabola.

Practice Problems

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

a) $f(x) = 4x - 1$ $x = 7$

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

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

2. Evaluate each expression for $f(x) = x^2 + x$

a) $f(3)$

b) $f(m)$

c) $f(x + 1)$

d) $f(x + h)$