COLLEGE REVIEW MATH
SECTION 1D

LINEAR FUNCTIONS AND MODELS

The importance of zero….

The senior class has paid \$200 to rent a roller skating rink for a fund-raiser. Tickets for those attending will be \$5

a) Model the net income as a function of the number of tickets sold.

n(x) = 5x – 200

b) Identify the point at which the class begins to make a profit.

5x – 200 > 0
5x > 200
x > 40

Every ticket sold after the 40^{th} one is profit.

c) What is their profit if they sell 75 tickets?

n(x) = 5x – 200
n(75) = 5(75) – 200
= 375 – 200
= 175
\$175 profit

Examples:

1) If $f(x) = \frac{2}{3}x - 12$ find: f(9), f(-12), and the zero of the function

f(9) = 2/3(9) – 12
= 6 – 12
= -6

f(-12) = 2/3(-12) – 12
= -8 – 12
= -20

0 = 2/3x – 12
12 = 2/3x
18 = x
the function's zero is 18

2) If $g(x) = \frac{3x - 11}{2}$ determine if g(3) + g(5) = g(8)

g(3) = 3(3) – 11 / 2
= (9 – 11) / 2
= -2/2
= -1

g(5) = 3(5) – 11 / 2
= (15 – 11) / 2
= 4/2
= 2

g(8) = 3(8) – 11 / 2
= (24 – 11) / 2
= 13/2
= 6.5

NO.
$-1 + 2 \neq 6.5$

3) If $h(x) = 8$ find: h(0), h(412) and determine the slope of the function

h(0) = 8
since there is nothing to plug in h(0) is literally 8

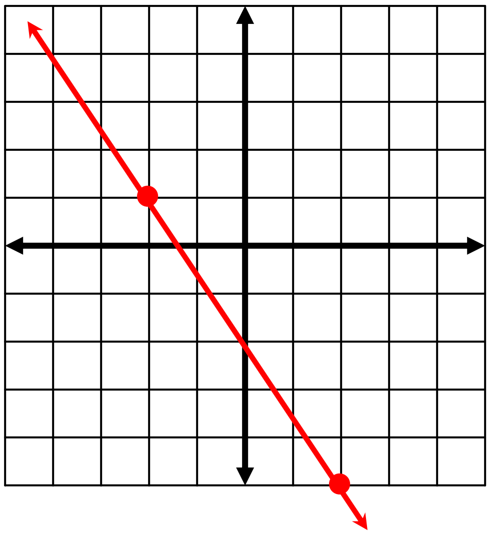
h(412) = 8
= 8

The function h(x) = 8 is called a constant function (there is no variable attached to the 8). Constant functions are horizontal lines so m = 0

Modeling a linear function by graphing…

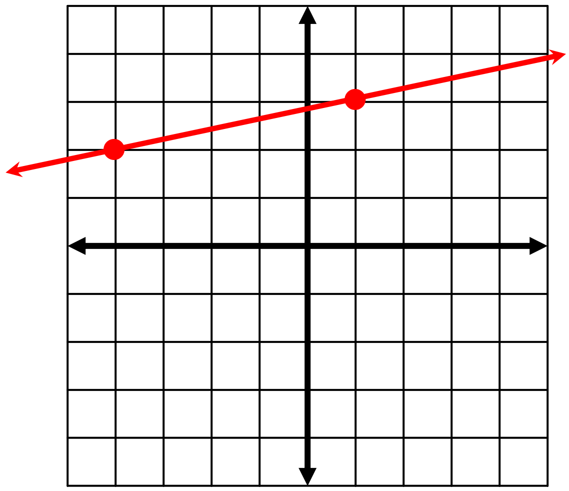
Examples: In each of the cases below assume *f* is a linear function.
Sketch its graph, and find an equation such that…

1) f(-2) = 1 and f(2) = -5



m = -3/2 (count rise over run)
y = -3/2x + b   plug in either pt.
1 = -3/2(-2) + b
1 = 3 + b
-2 = b   f(x) = -3/2x – 2

2) f(1) = 3 and f(-4) = 2



m = 1/5
y = 1/5x + b
3 = 1/5(1) + b
3 = 1/5 + b
14/5 = b   f(x) = 1/5x + 14/5

Modeling a linear function with data…

Mr. McConnell	Monday	Tuesday	Wednesday	Thursday	Friday
Times seen	4	1	9	6	5
Smart comments	14	5	29	20	17

Write a linear function to represent the number of smart comments Mr. McConnell will deliver as a function of the number of times you see him on any given day.

Treat the data like a set of coordinates, pick any two to determine a slope.

$$m = \frac{5-14}{1-4} = \frac{-9}{-3} = 3$$

y = 3x + b   pick one of the two you
5 = 3(1) + b   to plug in
2 = b   M(x) = 3x + 2