*AAT

Chapter 8: Tasks #1-6 (IC)

Name: Key

Date: _____ Period: _____

Task #1:

1. Write about a real-life situation in which variable *y* depends on variable *x*. In other words, if y increases, so does x. How would it appear in a graph?

i.e. - y might be profit ; x the # of items sold

graph - slope up ; to the right

2. Now write about a real-life situation in which variable *y* decreases as variable *x* increases. How would it appear in a graph?

i.e. - y might be amount of gas in car on trip ; x the time you have been traveling

3. In a coordinate graph of two related variables, when do the points lie in a straight line?

common slope

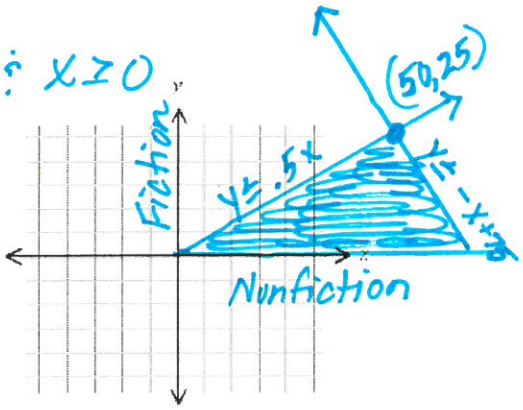
Task #2:

Margo is a librarian for the east branch of the Harrison City Library. Each year she adds new books, both fiction and nonfiction, to the library's collection. This year her budget limits her to no more than 75 new books. Library policy states that new fiction books can be no more than half the number of nonfiction books.

1. If *x* represents the number of nonfiction books and *y* represents the number of fiction books, write a system of inequalities that models Margo's situation.

$x + y \leq 75$; $y \leq .5x$; $y \geq 0$; $x \geq 0$

2. Graph this system of inequalities.



3. What information is revealed in your graph?

The intersection identifies the distribution of fiction ; nonfiction books for purchases.

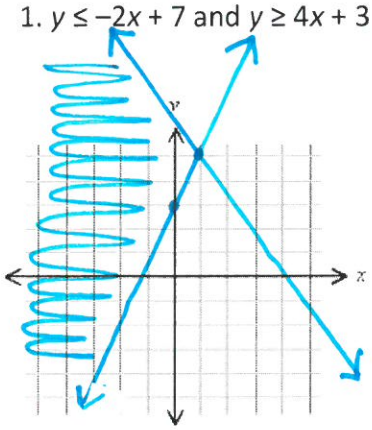
4. What is the greatest number of fiction books that Margo can buy this year?

50 nonfiction ; 25 fiction

Task #3:

Graph the region indicated by each pair of inequalities below.

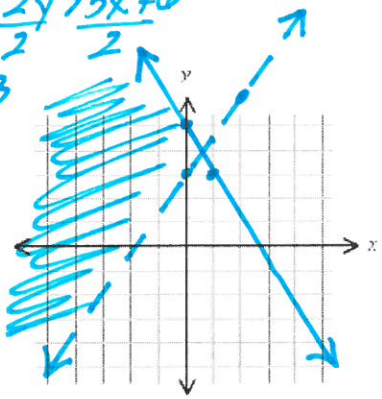
1. $y \leq -2x + 7$ and $y \geq 4x + 3$



2. $-3x + 2y > 6$ and $y \leq -2x + 5$

$\frac{2y}{2} > \frac{3x+6}{2}$

$y > \frac{3}{2}x + 3$



Task #4:

The temperature in Celsius of a block of hot metal as it cools is given by the function $T(x) = 95(1 - 0.45)^x + 20$, where x is expressed in hours.

1. What is the starting temperature for this hot metal block?

$95(1-.45)^0 + 20$

$95 + 20$

115° C

2. What will the temperature be after 3 hours?

$95(1-.45)^3 + 20$

35.8

≈ 36 °C

3. What will the temperature be when the block has finished cooling?

Use table

21	20
22	20
23	20
24	20
⋮	

20° C

Task #5:

During their investigation of radioactive decay, a research group discovered that the equation $f(x) = 200(1 - 0.18)^x$ fits their data. Unfortunately, one member of the group spilled coffee on the table and made the data unreadable. Reconstruct what their table might have looked like using the chart below. Explain what is being represented in the equation by 200 and 0.18.

x	y
0	200
1	164
2	134.48
3	110.27
4	90.42
5	74.15
6	60.80

200 represents measure of starting quantity

.18 represents 18% decay rate

Task #6:

A tennis ball has been dropped from the top of a tall building. The ball's height in meters t seconds after it is released can be represented by $h(t) = -4.9t^2 + 150$.

1. Find $h(3)$ and explain what this represents in the situation described.

$h(3) = -4.9(3)^2 + 150 = 105.9$ m

height of tennis ball 3 sec after release

2. How much time will elapse (to the nearest .01 second) until the ball is at or less than 25 meters above the ground?

$-4.9t^2 + 150 \leq 25$

$t \geq 5.05$ sec

3. When will the tennis ball hit the ground?

$-4.9t^2 + 150 = 0$

$t = 5.53283$

~~$t = -5.53283$~~