

Name: _____

ALGEBRA 1 — FINAL EXAM 2004 – Part 2

Overall instructions:

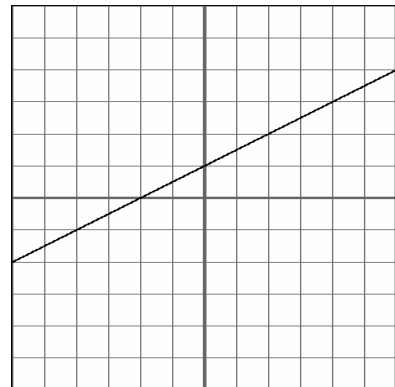
- There is a mix of easier and harder problems. Don't give up if you see some questions that you don't know how to answer. Try moving on to other problems.
- Everyone is allowed one block to complete this section of the final. This includes 20 minutes extra time for everyone. If you need additional time, please notify your teacher.
- You may use a calculator anytime that it is helpful.
- Sharing of calculators is not allowed.
- Use the back of any page for scratch work. Only the fronts of the pages will be graded.
- You may use the "Linear Equations Summary of Strategies" document as a note sheet. A copy is attached to this exam (you may detach this copy from the rest of the exam).
- There are 42 points total in this part of the exam. Point values for individual problems are given at the start of each section.

Part A. Multiple choice questions

(2 points each)

1. Which of these functions has the graph shown here?

- (A) $f(x) = 2x + 1$
- (B) $f(x) = \frac{1}{2}x + 1$
- (C) $f(x) = \frac{1}{2}x - 2$
- (D) $f(x) = -\frac{1}{2}x - 2$



2. Which of these points does **not** lie on the graph of $y = -3x - 4$? (*Hint*: points on a graph are solutions to the equation.)

- (A) $(0, -4)$
- (B) $(1, -1)$
- (C) $(-1, -1)$
- (D) $(-2, 2)$

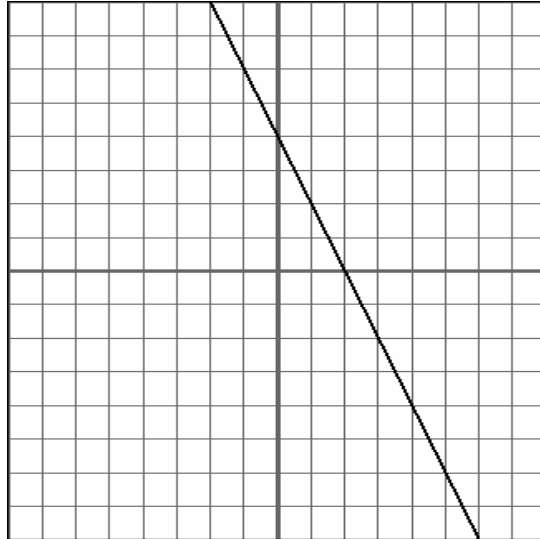
3. For the line with the equation $y = -2x + 1$, what is $\frac{\text{rise}}{\text{run}}$?
- (A) 2
 - (B) $\frac{1}{2}$
 - (C) -2
 - (D) None of the above
4. Find the slope of the line that passes through the points $(-4, 3)$ and $(6, -2)$.
- (A) -2
 - (B) $-\frac{1}{2}$
 - (C) $\frac{1}{2}$
 - (D) 2
5. A family membership at a swimming pool costs a flat fee of \$100, plus \$50 per person. If n stands for the number of people, then the membership cost is modeled by
- (A) $C = 50n + 100$
 - (B) $C = 100n + 50$
 - (C) $C = 100 + 50 + n$
 - (D) $C = 150n$
6. Find the intersection of the lines $y = 3x + 5$ and $y = -x + 1$. (**Hint:** The intersection of two lines is where the two functions are equal.)
- (A) $(1, 1)$
 - (B) $(1, 2)$
 - (C) $(-1, 1)$
 - (D) $(-1, 2)$

Part B. Equations, tables, and graphs

(8 points each)

1. a. Make a table of (x, y) pairs for the given line.

x	y

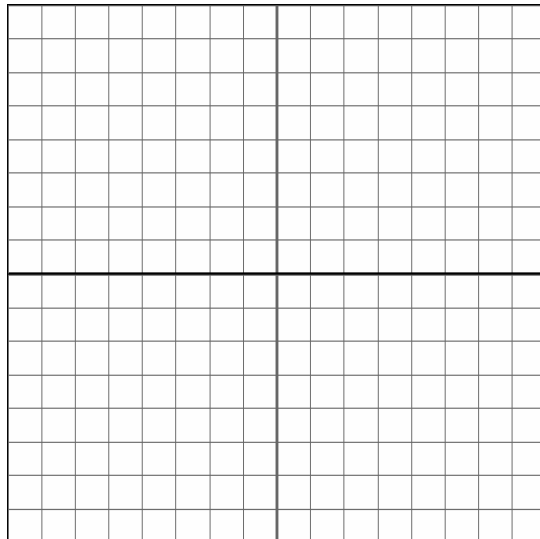


b. Write an equation for the line given above.

2. a. Use the following “word description” of a linear function to write the equation for this function. “Take the input, multiply by 2, then subtract 1.” Call the input x and the output y .

b. Make a table and a graph for this function.

x	y



Part D. You make them up

(2 points each)

Directions: These problems ask you to make up equations, tables, and graphs that meet certain conditions.

1. Make up an equation for a line that is **steeper than** the line $y = 4x + 6$.
2. Make up an input-output table for a line that has a slope of -3 .

input (x)	output (y)

3. Make up an equation for a line that **slopes downward** (as you go from left to right).

Part E. Real world problems — show your work (10 points each)

Directions: Show your work. If you use a calculator table or graph as part of your solution, copy it down onto your test paper.

1. Suppose that a library currently has 7000 books, and is buying 150 more books per year.

a. How many books will the library have, 4 years from now?

b. How many books will the library have, n years from now?
(Your answer should be a formula involving n .)

c. How many years will it take for the library collection to reach 10000 books?

d. Suppose you made a graph of the relationship between the number of years from now and the number of books. What numbers would be the slope and the intercept?

slope = _____ intercept = _____

Linear Equations ($y = mx + b$) Summary of strategies

<i>If you have...</i>	<i>and you need...</i>	<i>here's what to do...</i>
an equation in the form $y = mx + b$	the slope and/or the y-intercept	The number m from the equation is the slope. The number b from the equation is the y-intercept.
two points	the slope	Calculate the slope using $m = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$.
a table or a graph	the slope	<ul style="list-style-type: none"> Choose any two points from the table or the graph. Calculate the slope using $m = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$.
slope and y-intercept	an equation	Write $y = mx + b$, putting in the slope as m and the intercept as b .
slope and one point	an equation	<ul style="list-style-type: none"> Write $y = mx + b$. Put in the slope as m. Put in the point as x and y. Solve for b. Write your final answer $y = mx + b$ with numbers in place of m and b.
two points	an equation	<ul style="list-style-type: none"> Calculate the slope using $m = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$. Write $y = mx + b$. Put in the slope as m. Choose <u>one</u> of the two points and put it in as x and y. Solve for b. Write your final answer $y = mx + b$ with numbers in place of m and b.
a table	an equation	Take any two points from the table. Then follow the steps above for two points.
a graph	an equation	Choose either of these two methods. Slope-intercept method: <ul style="list-style-type: none"> Calculate the slope using $m = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$. Where does the line cross the y-axis? That number is the y-intercept. Call that number b. Write your final answer $y = mx + b$ with numbers in place of m and b. Two point method: Take any two points from the graph, then follow the steps above for two points.
an equation in the form $y = mx + b$	a table	<ul style="list-style-type: none"> If the x values aren't given, fill in your own choices for x (for example: $-5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5$). One at a time, put each x value into the equation and compute the y value that goes with it.
an equation in the form $y = mx + b$	a graph	Choose either of these two methods. Table method: <ul style="list-style-type: none"> Make a table of x and y values. Make a graph from the table. Intercept-and-slope method: <ul style="list-style-type: none"> Draw the y-intercept point at b on the y-axis. Move right by 1 and up/down by m, and draw a second point. To get more points, either repeat the 1-and-m step, or just draw the line with a ruler.