Your Name _____

Teacher _____

ALGEBRA 1 — FINAL EXAM 2006

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 $1\frac{1}{2}$ hours, plus $\frac{1}{2}$ hour of extra time. Use your time well. Don't stop working before you're done.
- You may use a calculator anytime that it is helpful. Sharing of calculators is forbidden.
- Use the back of any page for scratch work. Only the fronts of the pages will be graded.
- Be sure to use the Note Sheet that your teacher will give you.

Part A. Multiple choice questions

(2 points each)

Directions: Circle the letter (A, B, C, or D) next to the correct answer.

1. Which of these is equal to $5(8 - x)$?

(A) $5x - 40$

(B) $40 - 5x$ **B**

(C) $x - 40$

(D) $5 - 8x$

2. Suppose $2(2 - y) = 3x$. When $y = 8$, what is the value of x ?

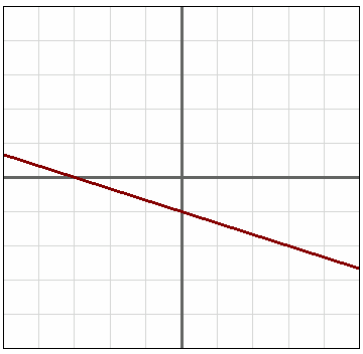
(A) $-20/3$

(B) $20/3$ **D**

(C) 4

(D) -4

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



(A) $f(x) = 3x + 1$

(B) $f(x) = \frac{1}{3}x + 1$ **D**

(C) $f(x) = \frac{1}{3}x - 1$

(D) $f(x) = -\frac{1}{3}x - 1$

4. Which of these points ***does not*** lie on the graph of $y = -2x + 7$?

(A) (–1, 9)
(B) (4, -1) **C**
(C) (–3, 1)
(D) (–2, 11)

5. Between a pair of points on the line $y = 5x - 2$, suppose that the ***rise*** is 15. Then the ***run*** is

(A) 3
(B) 4 **A**
(C) 5
(D) 10

6. Find the slope of the line that passes through the points (–4, 2) and (6, 6).

(A) –2/5
(B) 5/2 **D**
(C) –5/2
(D) 2/5

7. Sandra has been saving money on a weekly basis. She currently has $1125 in her account. If she has been saving the same amount of money for the past 75 weeks, how much money has she deposited each week.

(A) $20
(B) $15 **B**
(C) $10
(D) $5

8. A family membership at a tennis club costs a flat fee of $150, plus $25 per person. If n stands for the number of people, then the membership cost is modeled by

(A) $25n + 150$
(B) $150n + 25$ **A**
(C) $150 + 25 + n$
(D) $175n$

9. Find the intersection of the lines $y = 2x + 1$ and $y = -5x - 6$.

(A) (1, 1)
(B) (1, 2) **C**
(C) (–1, –1)
(D) (–1, 2)

10. Which of these lines **<u>does not intersect</u>** the line $y = -2x + 3$?

(A) $y = 2x$
(B) $y = 2x - 3$ **D**
(C) $y = 2x + 3$
(D) $y = -2x - 3$

11. Solve the inequality $-3x + 8 < 11$.

(A) $x < -1$
(B) $x > -1$ **B**
(C) $x > 1$
(D) $x < 1$

12. Which of the following is equal to $m^{-9} \cdot m^{9}$?

(A) m^{18}
(B) m^{-18} **C**
(C) 1
(D) 0

13. Which of the following is equal to $(a^5b^4)^7$?

(A) $a^{35}b^{28}$
(B) a^5b^{11} **A**
(C) $a^{-2}b^{-3}$
(D) $a^{12}b^{11}$

14. In how many ways can the letters in the word BEACH be rearranged?

(A) 120
(B) 60 **A**
(C) 30
(D) 5

15. My grocer's freezer has this selection of pies.

apple	8
pumpkin	16
blueberry	5
pecan	11

If I choose to buy a pie at random to bring to a July 4th cookout, what is the probability that I buy a pumpkin pie

(A) 1/5
(B) 2/5 **B**
(C) 16/5
(D) 1/2

16. Here are the number of text messages students send to each other on a daily basis

25, 23, 17, 15, 19, 21, 28, 30, 26, 28

Find the **median** of these scores.

(A) 20
(B) 21 **D**
(C) 23
(D) 24

17. When multiplied, which of the following gives you $x^2 + 2x - 8$?

(A) $(x-4)(x-2)$
(B) $(x+4)(x-2)$ **B**
(C) $(x-4)(x+2)$
(D) $(x+4)(x+2)$

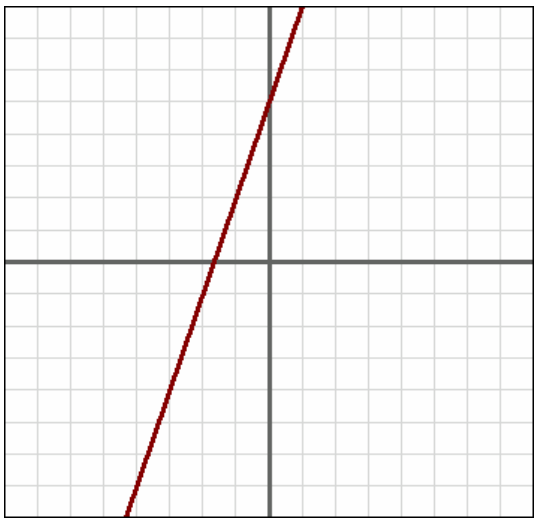
Part B. Equations, tables, and graphs

(8 points each)

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

x	y
-4	7
-3	-4
-2	-1
-1	2
0	5
1	8

4 points for table



b. Write an equation for the line given above.

Y= 3x + 5

4 points for equation

19. Here is a word description of a different function: "Multiply by -5, then add 2."

a. Write an equation for this function. Call the input x and the output y.

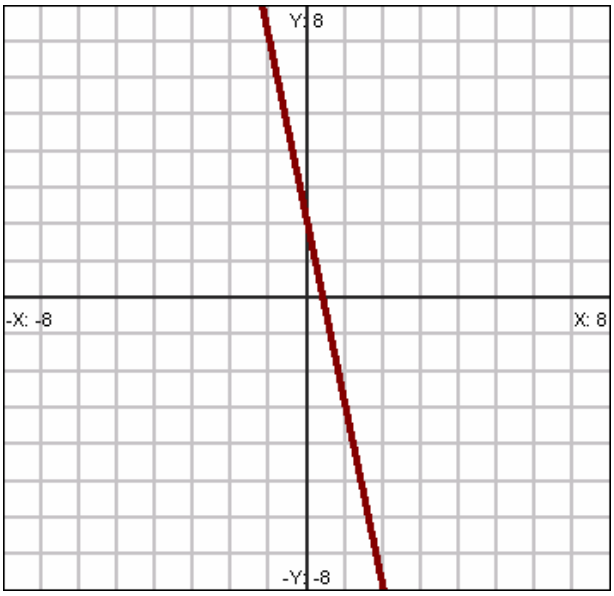
Y= -5x + 2

3 points for equation

b. Make a table and a graph for this function. ***3 points for graph***

x	y
-3	17
-2	12
-1	7
0	2
1	-3
2	-8
3	-13

2 points for table



20. You are given this information about a linear function $f(x)$:

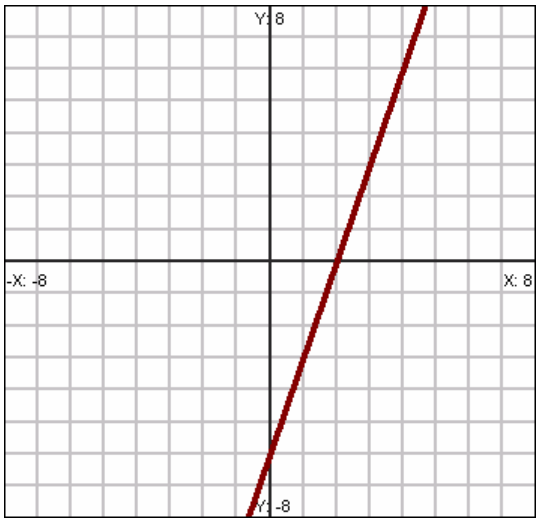
- $f(1) = -3$.
- The slope of the graph of $f(x)$ is 3.

Answer these questions about function $f(x)$:

a. On the grid, draw the graph of $f(x)$.

b. Write a function formula for $f(x)$.

Y = 3x - 6



4 points for graphing

4 points for equation of line

21. A table of values for a linear function $f(x)$ is given.

x	$f(x)$
–6	–7
–3	–5
0	–3
3	–1
6	1
9	3
12	5
15	7
18	9

a. What do the numbers in the *input* column change by?

1pt **3**

b. What do the numbers in the *output* column change by?

1pt **2**

c. What is the slope of the line for the graph of $f(x)$?

2pts **2/3**

d. What is the y-intercept?

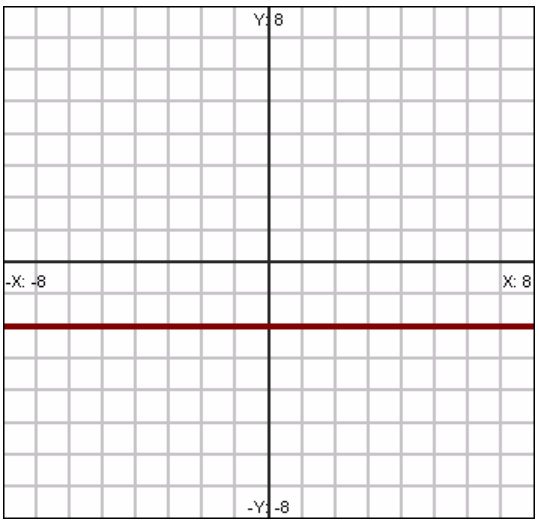
2pts **-3**

e. Write a function formula equation for $f(x)$.

2pts

Y = (2/3)x - 3

22. a. On the axes at the right, sketch the graph of the equation $y = -2$



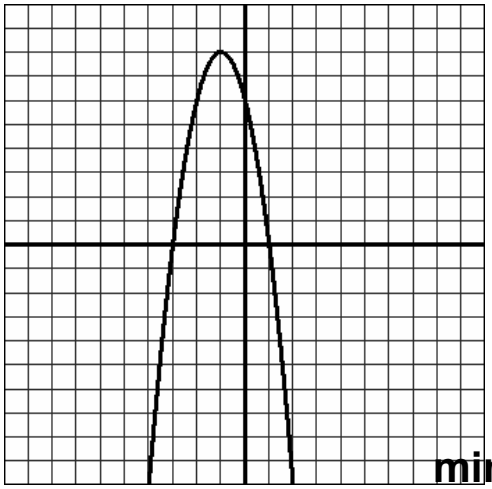
4pts for graph

b. Is the graph from part **a** the graph of a *function*? Tell why or why not.

4 pts for explanation

Yes, it is a function because each input maps to one output…or other acceptable responses

23. The graph of a quadratic function $f(x)$ is given on the grid.



a. What are the zeroes of $f(x)$?

4pts **-3 and 1**

b. At what x does $f(x)$ have its maximum value?

4pts **Maximum at x = -1** **min** **m**

24. Match the verbal statement to the algebraic expression that best matches it. ***1pt each***

2 less than five times a number	**b**	a. $x \geq 100$	f. $\sqrt{x}+8$
the sum of the square root of a number and 8	**f**	b. $5x - 2$	g. $x \leq 100$
a number is at least 100	**a**	c. $3(x + 1)$	h. $2 < 5x$
4 more than the square of a number	**e**	d. $\sqrt{x+8}$	i. $3x + 1$
3 times the sum of a number and 1	**c**	e. x^2+4	j. $4x^2$

Part C. Solving problems — show your work (5 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.

25. Using any method, solve this equation.

$$x+8 = 3(x-4)$$

Show work here:

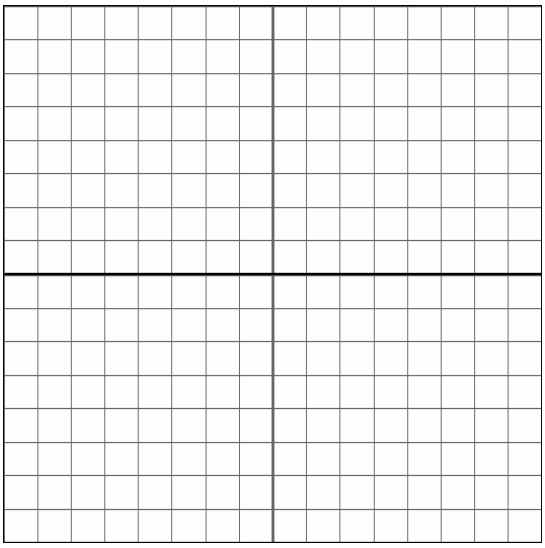
Write your solution here:

X = 10

26. Using any method, solve this system of equations.

$$\begin{cases} x+2y=1 \\ 5x-4y=-23 \end{cases}$$

Show work here:



Give at least one point for giving an x and y value

Write your solution here:

x = -3 and y = 2

27. Solve this inequality, then make a number line graph of the solution.

$-2 \leq 3x + 4 < 13$

Show work here:

1 point for graph

4 points for solving inequality

Write your solution:

$-2 \leq x < 3$

Graph your solution:

28. Using any method, solve this equation.

$|2x + 5| = 17$

Show work here:

1 point for setting up 2 equations

2 points for each equation

Write your solution here:

X = 6 and x = -11

29. Multiply the following and combine like terms where appropriate. Use the multiplication table method to help you if you wish.

1 pt. For using dist.Law
4 pts for work

a. $(2x-1)(3-x)$

	2x	-1
3	$6x$	-3
-x	$-2x^2$	x

$\boxed{-2x^2 + 7x - 3}$

b. $(a + b)(a - b)$

	a	b
a	a^2	ab
-b	$-ab$	b^2

$\boxed{a^2 - b^2}$

30. Simplify the expressions as much as possible. Show your steps. Express your answer with positive exponents.

a. $\left(A^{-1}B^3\right)^5$ $\qquad \dfrac{B^{15}}{A^5}$

1 pt. For using laws of exponent, then 2 and 2

b. $\dfrac{A^3B}{AB^4}$ $\qquad \dfrac{A^2}{B^3}$

31. Mrs. Sampson opens a 500-piece bag of candy. Students start consuming the candy at a rate of 30 pieces per school day. (10 points)

Let x = the number of school days since the bag of was opened

$f(x)$ = the number of pieces of candy remaining

2pts each

a. Write a function formula for $f(x)$.

f(x) = 500-30x or f(x) = -30x + 500

b. Evaluate $f(10)$.

f(10) = 200

c. Explain the real-world meaning of the number that is the answer to part **b**.

After 10 days there are 200 pieces of candy left

d. On a certain day, there are 320 pieces of candy remaining. How many days have passed since the package of candy was opened? Show your work.

X = 6

e. When $f(x)$ is graphed, what will be the slope and the y-intercept?

slope = -30 ***y*-intercept = 500**

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.

32. Make up an equation for a line that is **less steep than** the line $y = 3x - 7$.

-3 < m < 3 **1 pt is slope is neg. and <-3**

33. Make up an input-output table for a line that has a slope of $-1/2$.

input (x)	output (y)
-1	**0**
0	**-1/2**
1	**-1**
2	**-3/2**

34. Make up an equation for a line that **slopes upward**(as you go from left to right) with a y-intercept that is positive.

m > 1

35. Make up an input-output table that is…

not a function

input (x)	output (y)
-1	1
-1	2
0	3
1	4
2	5
3	6

is a function

input (x)	output (y)
-3	-1
-2	0
-1	1
0	2
1	3
2	4

36. Make up a graph that has a **negative slope**.