

Name \_\_\_\_\_

Teacher-block (circle): Bowman-B      Goldberg-G      Gordon-A      Kelly-D  
Bowman-C      Goldberg-H      Kelly-E

# Lexington High School Mathematics Department Algebra 1B Final Exam 2008

## Format and scoring

- This exam has two parts.
- Part A: 15 short questions, 2 points each, generally graded right-or-wrong.
- Part B: 6 long questions, 6 points each; partial credit will be given.
- A letter grade scale will be set by the course faculty after the tests have been graded.

## Rules

- This is a 90-minute exam, but you are allowed to work for up to 120 minutes.
- All work to be graded must be written in this test packet. You may request extra paper for scratch work if needed.
- Graphing calculators are permitted, but may not be shared between students.

## Advice

- Remember to show work. The more you write, the more opportunities you will have for partial credit.
- On many questions, there are ways to check your answers. Make sure you do this.
- Many calculator difficulties can be fixed by typing this reset sequence:  
[2nd][+][7][1][2].
- Don't give up early — work for the full time that you are allowed.
- Your teachers all say: We know you can do it!

*Do not write in these boxes:*

Q 1-3 /6	Q 4-7 /8	Q 8-9 /4	Q 10-12 /6	Q 13-15 /6	PART A SUBTOTAL /30
Q 16 /6	Q 17 /6	Q 18-19 /12	Q 20 /6	Q 21 /6	PART B SUBTOTAL /36
					TOTAL /66

## Part A. Short questions

15 questions, 2 points each, 30 points total

Generally these questions will be graded right-or-wrong.

1. a. Solve the equation  $|-6x + 8| = 14$ .

b. Solve the inequality  $|-6x + 8| < 14$ .

2. For the linear function  $f(x)$ ,  $f(0) = 5$ ,  $f(6) = 0$ .

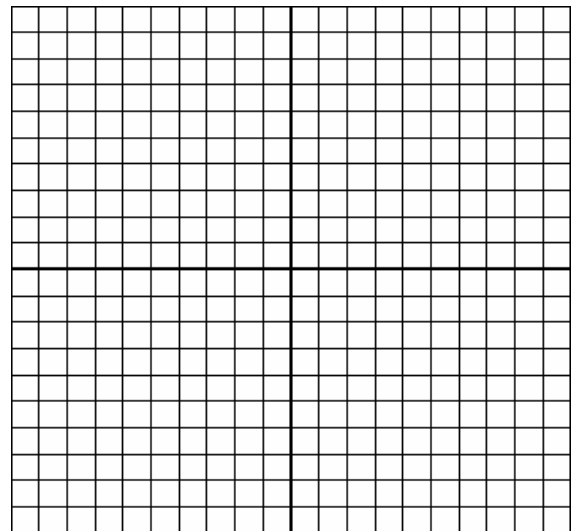
a. Find the intercepts.

x-intercept = ( \_\_\_\_\_ , \_\_\_\_\_ )

y-intercept = ( \_\_\_\_\_ , \_\_\_\_\_ )

b. Find the slope of  $f(x)$ .

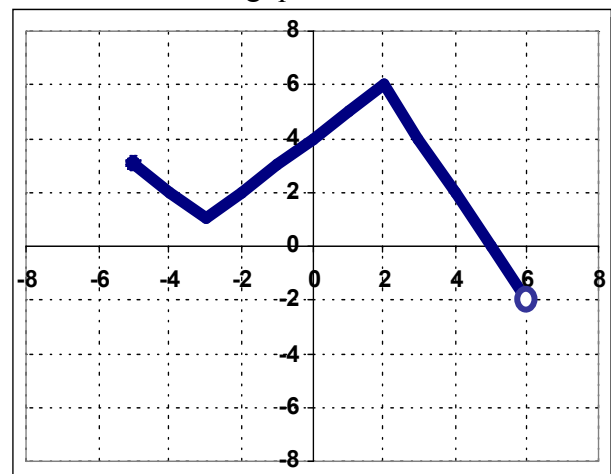
*Graphing Grid (Optional)*



3. Use the graph of the function  $f(x)$  below to answer the following questions

a. What is the domain of  $f(x)$ ?

b. For what values of  $x$  does  $f(x) = 4$ ?



4. Which of these points ***does not*** lie on the graph of  $f(x) = -2x + 7$ ? Circle your answer below.

- (A)  $(-1, 9)$       (B)  $(4, 0)$       (C)  $(3, 1)$       (D)  $(-2, 11)$

5. Find the intersection of the lines  $y = 2x + 1$  and  $y = -5x - 6$ . Circle your answer below.

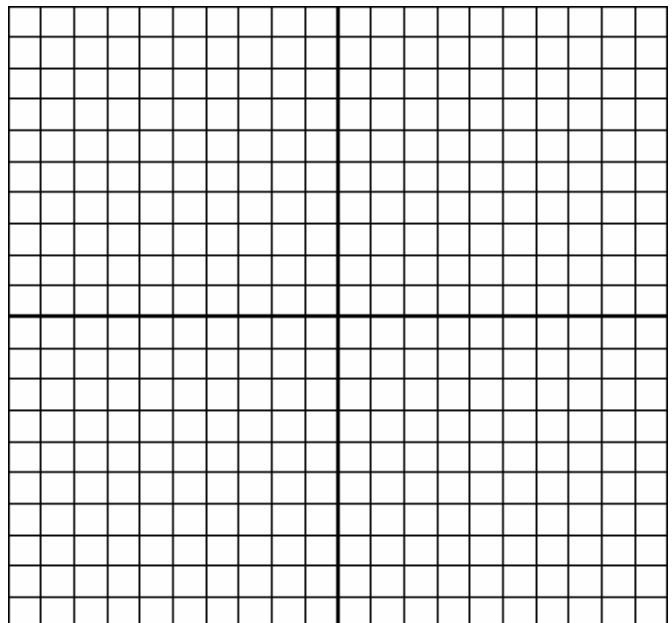
- (A)  $(1, 1)$       (B)  $(1, 2)$       (C)  $(-1, -1)$       (D)  $(-1, 2)$

6. Line  $l$  has the equation  $y = -2x + 3$ .

a. Write an equation of a line that does not intersect line  $l$ .

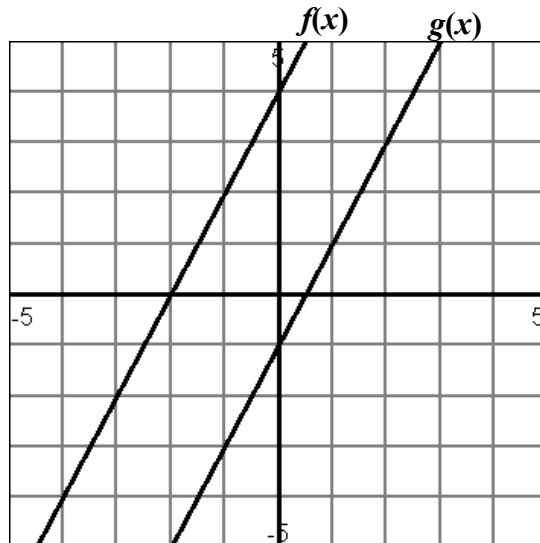
b. Write an equation of a line perpendicular to line  $l$  that passes through point  $(4, 1)$ .

7. Use graphing to solve:  
 $x = 2$   
 $2y = 4x + 2$

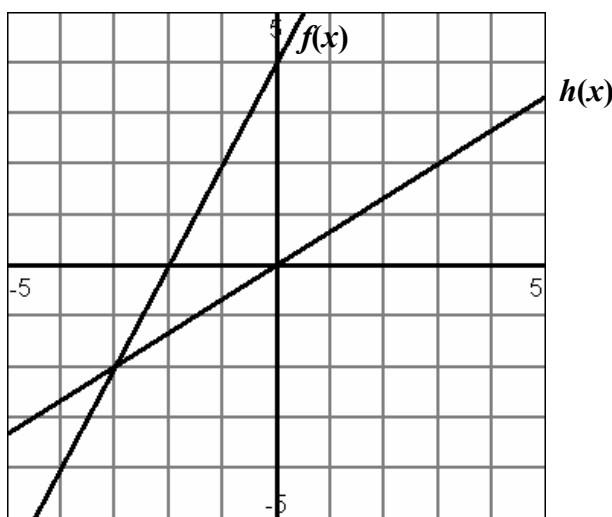


8. Use substitution to solve:
- $$3x + y = 21$$
- $$10x + 5y = 65$$

9. a. What are the solutions to the equation  $f(x) = g(x)$ ? **Solution(s):** \_\_\_\_\_



- b. What are the solutions to the equation  $f(x) = h(x)$ ? **Solution(s):** \_\_\_\_\_



10. Determine whether the following are equal to 10. Circle Yes or No.

$\frac{\sqrt{300}}{\sqrt{3}}$	$\sqrt{(-6)^2 + 8^2}$	$-\sqrt{-100}$	$2\sqrt{50}$
Yes   No	Yes   No	Yes   No	Yes   No

11. Solve  $2(x - 3)^2 = 98$  algebraically.

12. Solve  $3x^2 - 2 = 5x$  by factoring.

13. Let  $f(x) = x^2 - 2x$  and  $g(x) = 3x^2 - 4x - 4$ . Find the following.

a.  $f(x) - g(x)$

b.  $f(x) \cdot g(x)$

14. Use properties of exponents to simplify each expression

a.  $(3x^7y^3)(-12x^{-4}y)$

b.  $\frac{6x^9}{3x^4}$

15. Suppose that 5 friends go to a movie together.

a. In how many different ways could the 5 friends line up to get their tickets?

b. Suppose that 2 out of the 5 friends are going to buy popcorn for everyone. How many different ways could this happen?

## Part B. Long questions

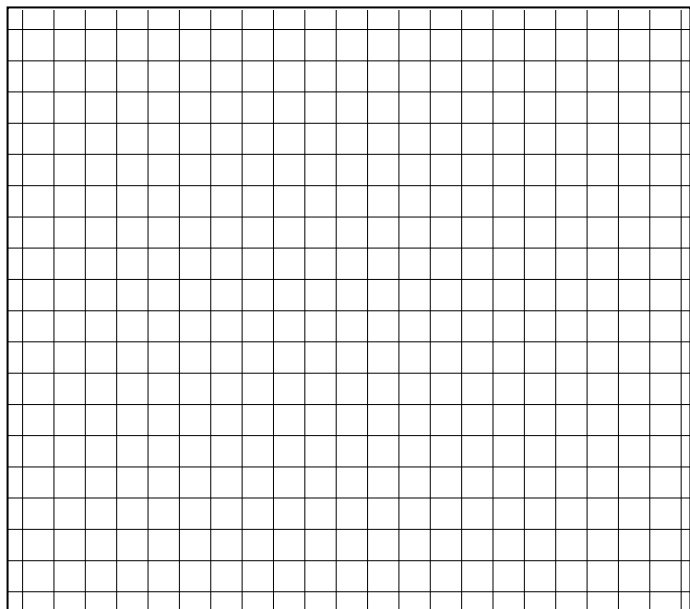
6 questions, 6 points each, 36 points total

16. The air pressure inside a bike tire is measured in PSI (pounds per square inch). Soraya inflates the front tire of her bike to a pressure of 60 PSI. Air leaks out of the tire at a steady rate of 1.5 PSI each day.

Let  $x$  = the number of days since the tire was inflated  
 $f(x)$  = the air pressure in the tire measured in PSI

- Write a function formula for  $f(x)$ .
- Evaluate  $f(2)$  and explain the real-world meaning of the answer.
- Soraya's bike becomes dangerous to ride when the tire pressure reaches 36 PSI. Write and solve an equation to determine on what day the bike becomes dangerous to ride.
- Find the  $x$ -intercept of the graph of  $f(x)$ , and explain the real-world meaning of the answer.

*Graphing Grid (Optional)*



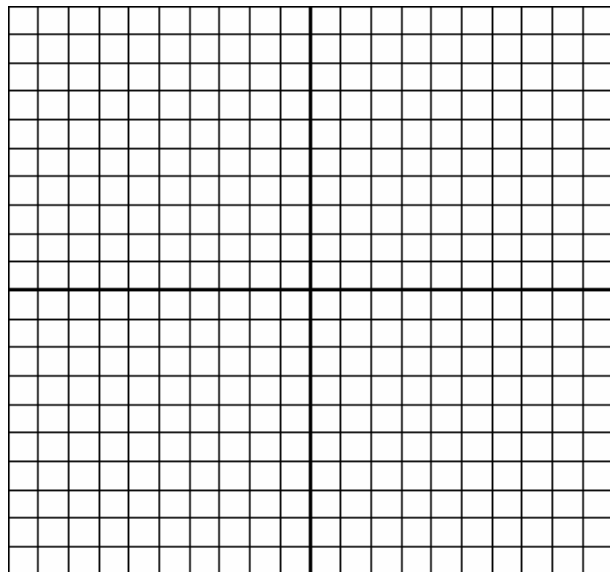
17. Ella, a student in the freshman class, is selling candy to raise money. M&M's sell for \$1.50 per package and Reese's sell for \$2 per package. Ella sold a total of 50 packages of candy and collected \$95.00.

Let  $x$  represent the number of packages of M&M's

Let  $y$  represent the number of packages of Reese's

- a. Write an equation that models the total number of packages sold.
  
  
- b. Write an equation that models the total amount collected.
  
  
- c. Use a method of your choice to solve this system.
  
  
- d. How many of each type of candy did she sell? Write your answer as a complete sentence.

*Graphing Grid (Optional)*

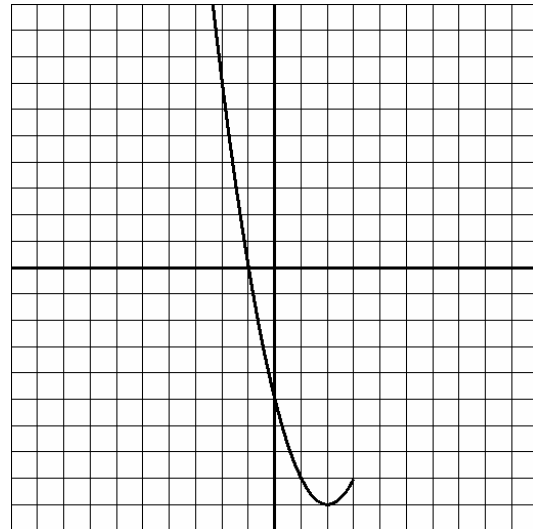


**18.** There are two paintings you admire in an art gallery. The owner of the gallery compliments you on your taste and explains how the value of each painting is to be determined. Painting  $A$  is currently worth \$500 and its value is expected to increase by 7% each year. Painting  $B$  is also currently worth \$500 and its value is increasing by \$7 each year. Use this information to answer the following questions.

- a. Let  $A(x)$  represent Painting A's value in  $x$  years. Use the given information to write a function formula for  $A(x)$ .
  
- b. Let  $B(x)$  represent Painting B's value in  $x$  years. Use the given information to write a function formula for  $B(x)$ .
  
- c. Evaluate  $A(30)$  and  $B(30)$  and explain their meanings.

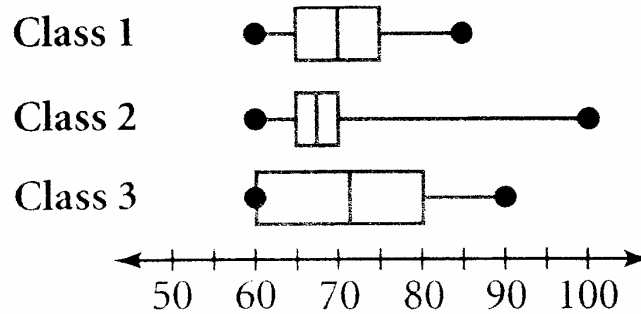
**19.** Here are a partial table and graph for a quadratic function.

$x$	$y = f(x)$
-2	7
-1	0
0	-5
1	-8
2	-9
3	
4	



- a. Complete the table and complete the graph of the parabola.
  
- b. Draw the axis of symmetry and write its equation.
  
- c. List the zeros of the function.
  
- d. Find the coordinates  $(x, y)$  of the  $y$ -intercept.

20. Three classes took the same science test. Here is a box and whisker (boxplot) showing the scores in each class.



- a. If students had to score at least 70 to pass the test, what percent of each class passed the test? Give the most specific answer you can, based on the given information.

*Class 1:*

*Class 2:*

*Class 3:*

- b. The teacher of **Class 3** allows all students who scored less than 80 to retake the test. What percent of Class 3 would be allowed to retake the test?

- c. Identify something shown in the boxplot that all three classes have in common.

21. A kitchen drawer contains:

1 blue fork
1 blue spoon
1 blue knife
1 green fork
1 red fork
1 red knife
2 red spoons

These questions are about drawing things from the drawer at random.  
After each question, everything is returned to the drawer for the next question.

- a. Suppose that one thing is drawn from the drawer at random. Calculate the probability that it could be:

$$P(\text{red}) =$$

$$P(\text{blue}) =$$

$$P(\text{green}) =$$

- b. Suppose that someone draws one thing from the drawer, and sees that it is a spoon. What is the probability that this spoon is red?
- c. Suppose that someone else reached into the drawer and drew **two** things from the drawer (both taken at the same time). What is the probability that **both** of them are spoons?