

1. (3) I am thinking of a number. I multiplied my number by 2, subtracted 8, doubled the result, and added 11. Then I subtracted 6. Then I divided by 5. After all that, I was left with 9. What number did I start with? Show your number is right by working the steps forwards. Please circle your answer and label the check.

2. (4) I made a lot of cupcakes for my son's bake sale. My daughter ran through the kitchen and knocked 20 of them off the table, which then needed to be thrown away. My husband came in and decided to hoard 15 cupcakes and put them in the freezer for later. My next door neighbor came by and asked for  $\frac{1}{4}$  of what I had left so that she could contribute to the bake sale. So I gave her those. After that, I realized that my daughter needed to donate 40 cupcakes for her school's bake sale so I set those aside. When all was done, I had 29 cupcakes to give my son for his bake sale. How many cupcakes can I tell my son that I originally made for him? Show your number is right by working the steps forwards. Please circle your answer and label the check.

3. (4) My two sisters pooled their savings and decided to go on a shopping spree. They started at Macy's and each bought a pairs of jeans and a shirt, spending \$45 each. Next they went to a shoe store and one bought a pair of shoes for \$28 while the other spent \$35 on a pair. The older sister then spent \$27 on makeup. They were hungry and so spent  $\frac{1}{5}$  of what they had left on lunch. They then stopped by the music store and bought 4 CDs for \$9 each. They spent half of what they had left on a gift for mom. On the way home, they spent \$35 on gas. When they got home, they had \$87. How much money did they start with?

4a. (3) Use guess-and-check to explore the following question. You do not need to use the table to solve the problem completely because you will be asked to solve it algebraically.

*The total cost of a basketball was \$19.29, including a 7.25% sales tax. How much of that cost was the price of the basketball and how much was the tax?*

4b. (3) Use your guess-and-check table from part *a* to now set up and solve an algebraic equation to answer the question. Be sure to explicitly define your variable. Answer the question with a sentence or phrase.

5a. (3) Use guess-and-check to explore the following question. You do not need to use the table to solve the problem completely because you will be asked to solve it algebraically.  
*Barbie has \$4.35 in quarters and nickels. She has three more nickels than she has quarters. How many of each coin does she have?*

5b. (3) Use your guess-and-check table from part *a* to now set up and solve an algebraic equation to answer the question. Be sure to explicitly define your variable. Answer the question with a sentence or phrase.

6. (3) Use the method of finite differences to find the formula for the following function shown in the table below. Write your formula down specifically.

$x$	$y = f \cdot x + e$	Difference between $y$ -values
0	13	
1	18	
2	23	
3	28	
4	33	
5	38	

7. (3) Use the formula you found in the last question to find the  $y$ -value when  $x$  is 37. (If you were unable to find a formula, make up one now and use it to answer the question so you can get these points.)

8. (3) Use the method of finite differences to find the formula for the following function shown in the table below. Write your formula down specifically. **Notice that the  $y$ -value for  $x = 0$  is missing. You will have to infer it from the table.**

$x$	$y = f \cdot x + e$	Difference between $y$ -values
0		
1	4	
2	1	
3	-2	
4	-5	
5	-8	

9. (3) Use the formula you found in the last question to find the  $y$ -value when  $x$  is 40. (If you were unable to find a formula, use  $y = -5x + 15$  to answer the question so you can get these points.)

10. (4) Complete the table of finite differences below, but this time, we do it in general using the function  $y = gx^2 + fx + e$ . Also find the differences of those differences, shown in the fourth column.

$x$	$y = gx^2 + fx + e$	Difference between y-values	Difference between entries in previous column (differences)
0			
1			
2			
3			
4			
5			

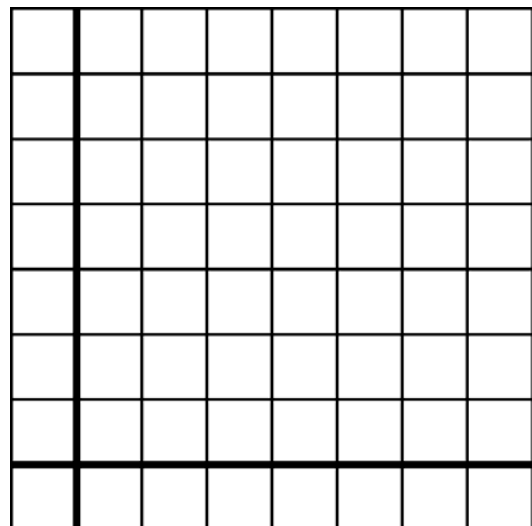
11. (3) Use the method of finite differences to find the formula for the function below. Show your work for finding  $g$ ,  $f$ , and  $e$ .

$x$	$y = gx^2 + fx + e$	Difference between y-values	Difference between entries in previous column (differences)
0	-3		
1	3		
2	17		
3	39		
4	69		
5	107		

12. (3) The movie *Jaws* was a big hit and grossed \$130 million. The sequel (*Jaws II*) didn't do so well, and neither did *Jaws III* or *Jaws IV*. Using the information in the chart below, draw a graph and use it to predict how much *Jaws V* might have grossed if the producers had filmed it. (There was no fifth film actually made.)

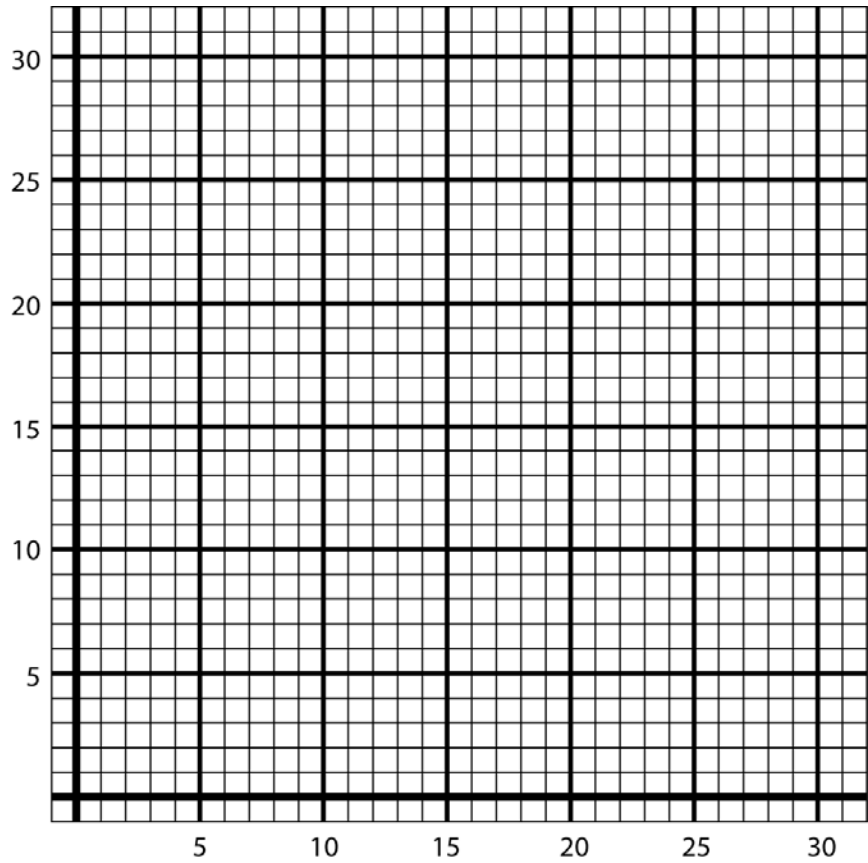
Be sure to label your axes with words and numbers. Write a sentence or two explaining your process.

Movie	<i>Jaws</i>	<i>Jaws II</i>	<i>Jaws III</i>	<i>Jaws IV</i>	<i>Jaws V</i>
Gross (in millions)	\$130	\$50	\$26	\$12	??



13. (3) Stacy has some dogs and geese on her farm. Last week, she bought little shoes for all her animals and so she knows they have a total of 60 feet. Today, she bought them 23 hats (because animals in shoes looked weird and she thought hats would help). How many geese and how many dogs does Crazy Stacy have?

You can solve this problem any way you like. I have provided some graph paper if you choose a graphical method. Label the axes if you use the graph.



14. (4) We want to make a scale drawing of a room that is 10 feet by 13 feet. If we want to use a scale of 1 centimeter equals 2 feet, answer the following questions.

a.) What are the dimensions of the room on paper (in centimeters)?

b.) In this room, there is a table that is 6 feet by 4.5 feet. What are the dimensions of this table in our scaled drawing?