

- 1) In the magic square below, the four numbers in each column, in each row, and in each of the two diagonals, have the same sum. What value should N have?

|   |    |    |    |
|---|----|----|----|
|   |    | 7  | 12 |
| N | 4  | 9  |    |
|   | 5  | 16 | 3  |
| 8 | 11 |    |    |

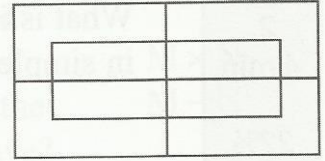
Expectations: Explain your reasoning. Show all your work.

- 2) Suppose all counting numbers are arranged in columns as shown at the right. Under what letter will the number 300 appear?

| A  | B  | C  | D  | E   | F  | G  |
|----|----|----|----|-----|----|----|
| 1  |    | 2  |    | 3   |    | 4  |
|    | 7  |    | 6  |     | 5  |    |
| 8  |    | 9  |    | 10  |    | 11 |
|    | 14 |    | 13 |     | 12 |    |
| 15 |    | 16 |    | ... |    |    |

Expectations: Explain your reasoning.

- 3) Different rectangles can be traced using the lines in the figure given at the right. How many different rectangles can be traced?



Expectations: Explain your reasoning. Show all your work.

- 4) Simon and Jimmy had 167 stamps altogether. Simon gave  $\frac{4}{7}$  of his stamps to Trina, and Jimmy gave 37 stamps to Trina. Simon and Jimmy had the same number of stamps left. How many stamps did Jimmy have in the beginning?

**NOTE:** You must prove your answer by showing this solution with bar modeling.

Expectations: Explain your reasoning. Show your work.

- 5) Tierra, Nico, and Alex had \$865 altogether. Tierra spent  $\frac{2}{5}$  of her money. Nico spent \$40, and Alex sent twice as much as Tierra. If the 3 friends had the same amount of money left, how much money did Alex have in the beginning?

**NOTE:** You must prove your answer by showing this solution with bar modeling.

Expectations: Explain your reasoning. Show your work.

- 6) In a department store, there were a certain number of red t-shirts, blue t-shirts, and yellow t-shirts.  $\frac{3}{7}$  of the t-shirts were red,  $\frac{1}{3}$  of them were blue, and the rest were yellow. If there were 20 more red t-shirts than blue t-shirts, how many yellow t-shirts were there?

**Hints:** Think about common denominators and the word "more." Not bar modeling.

Expectations: Explain your reasoning. Show your work.

- 7) Kate, Linda, and Maya each ate something different for supper yesterday. One ate steak, one ate fish, and one ate chicken. Maya did not have fish or chicken, and Linda did not have fish. What did each person eat for supper?

Expectations: Explain your reasoning. Show your work.

- 8) A football flew through the glass window of the teacher's room and shattered it to pieces. Four probable culprits were called to the principal for investigation.

COLIN: Jason did it!  
JASON: David did it!  
MELVIN: Not me!  
DAVID: Jason did it! His words cannot be trusted!

**HINT: ONLY ONE STUDENT TOLD THE TRUTH.**

**Who was the culprit? Errrrh!**

Expectations: Explain your reasoning. Show your work.

- 9) Find the value of C in the following.

|    |    |    |
|----|----|----|
| A  | C  | A  |
| B  | D  | B  |
| C  | E  | D  |
| 31 | 47 | E  |
|    |    | 64 |

Expectations: Explain your reasoning. Show your work.

## Tic-Tac-Toe Menu Directions

Choose at least any three activities from our tic-tac-toe menu. When you have **completed three activities**, you may decide to be finished. Or you may decide to keep going and complete more activities.

I choose activities # \_\_\_\_\_, # \_\_\_\_\_, # \_\_\_\_\_,

Additionally, I choose activities # \_\_\_\_\_, # \_\_\_\_\_, # \_\_\_\_\_, # \_\_\_\_\_

Do you have an idea for alternate activities you'd like to do instead for practice? Talk them over with your teacher.

I prefer to do the following alternate activities: \_\_\_\_\_

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**Reflection** on Homework Choices (tell what you liked, what was challenging, why you made the choices you made, what you learned, etc.) Were you able to do the work independently? Describe the kind of help your parents or tutors gave you.

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Student Name: \_\_\_\_\_ Date: \_\_\_\_\_

**PLEASE MAKE SURE THAT YOU HAVE ATTACHED ALL THE WORK YOU HAVE COMPLETED. IF IT IS A TECHNOLOGY ACTIVITY, MAKE SURE THAT YOUR PARENTS HAVE SIGNED THEIR NAME ON THAT BOX TO CONFIRM THAT YOU DID THE PRACTICE ACTIVITY FOR THE ALLOTTED TIME.**

**THANK YOU FOR ALL YOUR EFFORTS TO LEARN AND BECOME A BETTER MATHEMATICIAN.**

|   |    |    |    |
|---|----|----|----|
|   |    | 7  | 12 |
| N | 4  | 9  |    |
|   | 5  | 16 | 3  |
| 8 | 11 |    |    |

**N=15**

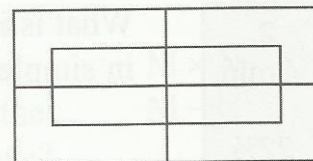
Expectations: Explain your reasoning. Show all your work.

2) Suppose all counting numbers are arranged in columns as shown at the right. Under what letter will the number 300 appear?

|    |    |    |    |     |    |    |
|----|----|----|----|-----|----|----|
| A  | B  | C  | D  | E   | F  | G  |
| 1  |    | 2  |    | 3   |    | 4  |
|    | 7  |    | 6  |     | 5  |    |
| 8  |    | 9  |    | 10  |    | 11 |
|    | 14 |    | 13 |     | 12 |    |
| 15 |    | 16 |    | ... |    |    |

Expectations: Explain your reasoning. **Column D**

3) Different rectangles can be traced using the lines in the figure given at the right. How many different rectangles can be traced?



Expectations: Explain your reasoning. Show all your work.

**Total 18 rectangles**

4) Simon and Jimmy had 167 stamps altogether. Simon gave  $\frac{4}{7}$  of his stamps to Trina, and Jimmy gave 37 stamps to Trina. Simon and Jimmy had the same number of stamps left. How many stamps did Jimmy have in the beginning? **76 stamps**

**NOTE:** You must prove your answer by showing two different ways to solve this; one way must with bar modeling.

Expectations: Explain your reasoning. Show your work.

5) Tierra, Nico, and Alex had \$865 altogether. Tierra spent  $\frac{2}{5}$  of her money. Nico spent \$40, and Alex sent twice as much as Tierra. If the 3 friends had the same amount of money left, how much money did Alex have in the beginning? **\$385**

**NOTE:** You must prove your answer by showing this solution with bar modeling.

Expectations: Explain your reasoning. Show your work.

6) In a department store, there were a certain number of red t-shirts, blue t-shirts, and yellow t-shirts.  $\frac{3}{7}$  of the t-shirts were red,  $\frac{1}{3}$  of them were blue, and the rest were yellow. If there were 20 more red t-shirts than blue t-shirts, how many yellow t-shirts were there?

Hints: Think about common denominators and the word "more." Not Bar Modeling.

**50 Yellow T-shirts**

Expectations: Explain your reasoning. Show your work.

7) Kate, Linda, and Maya each ate something different for supper yesterday. One ate steak, one ate fish, and one ate chicken. Maya did not have fish or chicken, and Linda did not have fish. What did each person eat for supper?

**Kate had fish, Linda had chicken, Maya had steak.**

Expectations: Explain your reasoning. Show your work.

8) A football flew through the glass window of the teacher's room and shattered it to pieces. Four probable culprits were called to the principal for investigation.

COLIN: Jason did it!

JASON: David did it!

MELVIN: Not me!

DAVID: Jason did it! His words cannot be trusted!

**ONLY ONE STUDENT TOLD THE TRUTH. WHO WAS THE CULPRIT?**

**Colin**

9) Find the value of C in the following.

|    |
|----|
| A  |
| B  |
| C  |
| 31 |

|    |
|----|
| C  |
| D  |
| E  |
| 47 |

|    |
|----|
| A  |
| B  |
| D  |
| E  |
| 64 |

**C=7**

Expectations: Explain your reasoning. Show your work.

## Question 1

### (Olympiad 14)

- 5) The sum of the entries in the diagonal beginning at the lower left is 34. Therefore the entry in column 3, row 1 is 2, the entry in column 4, row 1 is 13, and the entry in column 4, row 3 is 6. The sum of the entries in row 3 is  $N+19$ . Therefore  $N$  is 15. ( $N$  can also be determined by finding the entry in column 1, row 2 which is 10, the entry in column 2, row 4 which is 14, and the entry in column 1, row 4 which is 1. The sum of the four entries in column 1 is  $N+19$ .  $N$  is therefore 15.)

|   |   |    |    |    |
|---|---|----|----|----|
| 4 |   |    | 7  | 12 |
| 3 | N | 4  | 9  | 6  |
| 2 |   | 5  | 16 | 3  |
| 1 | 8 | 11 | 2  | 13 |
|   | 1 | 2  | 3  | 4  |

COLUMN

### Olympiad 15

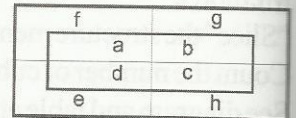
## Question 2

- 2) If each of the numbers shown is divided by 7, the numbers which have a remainder of 1 appear in column A, those with remainder 2 appear in column C, those with remainder 3 in column E, and so forth. Divide 300 by 7. The quotient is 42 and the remainder is 6, so 300 will appear in column D.

3) Method 1

### Question 3

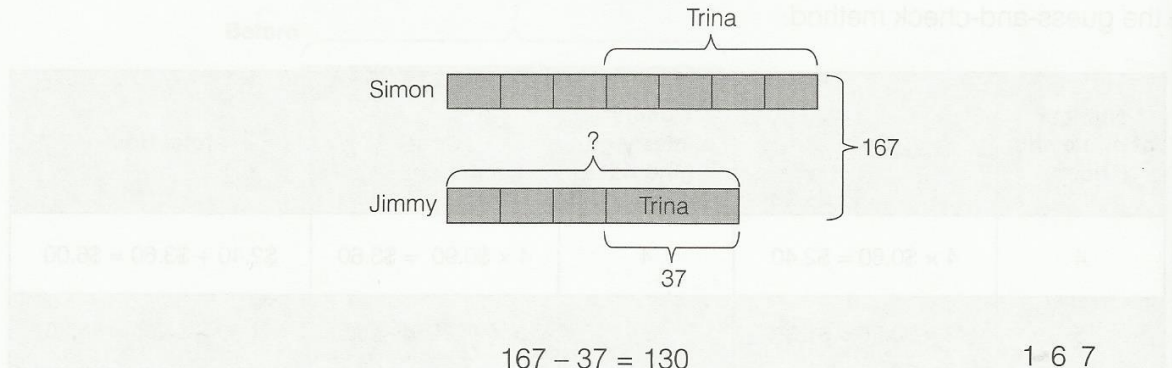
- 2) Notice that the rectangle contains 8 separate regions: a, b, c, d, e, f, g, and h. Some of these regions are rectangles. Other rectangles can be formed by combining two or more regions.



| <u>regions which form a rectangle</u> |                                                       | <u>number of rectangles</u> |
|---------------------------------------|-------------------------------------------------------|-----------------------------|
| 1 region:                             | (a),(b),(c),(d)                                       | 4                           |
| 2 regions:                            | (a,b),(b,c),(c,d),(d,a),<br>(a,f),(b,g),(c,h),(d,e)   | 8                           |
| 4 regions:                            | (f,a,b,g),(e,d,c,h),(f,a,d,e),<br>(g,b,c,h),(a,b,c,d) | 5                           |
| 8 regions:                            | (a,b,c,d,e,f,g,h)                                     | 1                           |
| total                                 |                                                       | 18                          |



# Solution to Question 6



Since 10 equal parts are 130,

$$\begin{array}{r} 167 \\ - 37 \\ \hline 130 \end{array}$$

each part is 13.

$$130 \div 10 = 13$$

$$\begin{array}{r} 13 \\ \times 3 \\ \hline 39 \end{array}$$

$$13 \times 3 = 39$$

$$39 + 37 = 76$$

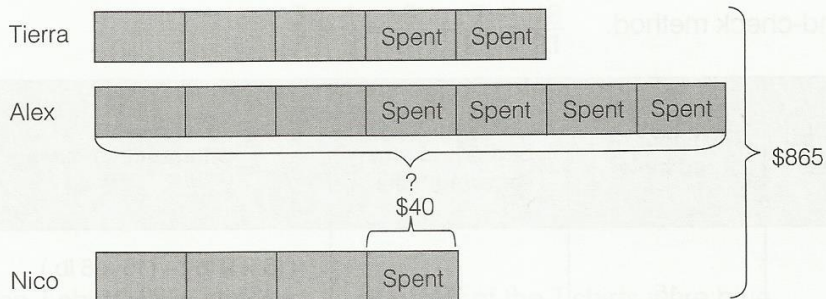
$$\begin{array}{r} 39 \\ + 37 \\ \hline 76 \end{array}$$

Jimmy had **76** stamps in the beginning.

Answer: 76 stamps

# Solution to Question 9

## Question 5



$$\$865 - \$40 = \$825$$

$$\begin{array}{r} 865 \\ - 40 \\ \hline 825 \end{array}$$

Since 15 equal parts are \$825,

$$\$825 \div 15 = \$55$$

$$\begin{array}{r} 55 \\ 15 \overline{) 825} \\ \underline{- 75} \phantom{0} \\ 75 \\ \underline{- 75} \\ 0 \end{array}$$

each part is \$55.

$$\$55 \times 7 = \$385$$

$$\begin{array}{r} \phantom{0}^3 55 \\ \times \phantom{0} 7 \\ \hline 385 \end{array}$$

Alex had **\$385** in the beginning.

Answer: **\$385**



# Solution to Question 11

$$\frac{3}{7} + \frac{1}{3} = \frac{9}{21} + \frac{7}{21} = \frac{16}{21}$$

## Question 6

$$1 - \frac{16}{21} = \frac{21}{21} - \frac{16}{21} = \frac{5}{21}$$

$\frac{5}{21}$  of the T-shirts were yellow.

$\frac{9}{21}$  (9 parts) of the T-shirts were red, and  $\frac{7}{21}$  (7 parts) of the T-shirts were blue.

$$9 \text{ parts} - 7 \text{ parts} = 2 \text{ parts}$$

There were 20 more red T-shirts than blue T-shirts.

$$\begin{aligned} 2 \text{ parts} &= 20 \\ 1 \text{ part} &= 20 \div 2 \\ &= 10 \end{aligned}$$

$\frac{5}{21}$  (5 parts) of the T-shirts were yellow.

$$5 \times 10 = 50$$

There were **50** yellow T-shirts.

Answer: **50 yellow T-shirts**

## Question 7

2. Stage 1:

|          | <i>S</i> | <i>F</i> | <i>C</i> |
|----------|----------|----------|----------|
| <i>K</i> |          |          |          |
| <i>L</i> |          | <b>X</b> |          |
| <i>M</i> |          | <b>X</b> | <b>X</b> |

Stage 2:

|          | <i>S</i> | <i>F</i> | <i>C</i> |
|----------|----------|----------|----------|
| <i>K</i> |          | ✓        |          |
| <i>L</i> |          | X        |          |
| <i>M</i> | ✓        | X        | X        |

Stage 3:

|          | <i>S</i> | <i>F</i> | <i>C</i> |
|----------|----------|----------|----------|
| <i>K</i> | <b>X</b> | ✓        | <b>X</b> |
| <i>L</i> | <b>X</b> | X        | ✓        |
| <i>M</i> | ✓        | X        | X        |

**Answer:** Kate had fish, Linda had chicken, and Maya had steak.

## Question 8

If Colin did it, he would be lying. Jason and David would also be lying. Only Melvin told the truth. So Colin was the culprit.

## Question 9

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9.  $A + B + C = 31$  ..... (1)  
 $C + D + E = 47$  ..... (2)  
 $A + B + D + E = 64$  ..... (3)  
(1) + (2)  
 $A + B + 2C + D + E = 78$  ..... (4)  
(4) - (3)  
 $2C = 14$   
 $C = 7$