

## Ticket Tables

Richard needs to sell 16 tickets to a large group. Knowing that the cost of one ticket is \$5.50, Richard calculates the cost of 16 tickets like this:

|                |             |              |              |              |              |              |
|----------------|-------------|--------------|--------------|--------------|--------------|--------------|
| <b>Tickets</b> | <b>1</b>    | <b>10</b>    | <b>2</b>     | <b>4</b>     | <b>6</b>     | <b>16</b>    |
| <b>Dollars</b> | <b>5.50</b> | <b>55.00</b> | <b>11.00</b> | <b>22.00</b> | <b>33.00</b> | <b>88.00</b> |

Explain how Richard solved the problem using his ratio table.

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From: Alice

Date: 2006-01-30 16:32:20

Richard got the answer by using the ratio table. He did  $10 + 6 = 16$     $55.00 + 33.00 = 88.00$

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Date: 2006-01-31 05:49:34

Hi Alice,

Thanks for starting to work on this problem. You've mentioned the "10," "6," and "16" columns of Richard's ratio table. Can you tell me why he has those other columns? How did that help him calculate the cost of the 16 tickets?

Talk to you again soon.

Shirley

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From: Alice

Date: 2006-02-01 16:23:06

Richard was trying to get from 1 to 16. So he did.....  $1 * 10 = 10$  and  $5.50 * 10 = 55.00$ . Next he realized he needed to get 6. So he doubled 1 and got 2,  $5.50 * 2 = 11.00$ . He doubled 2 and got 4, and  $11.00 * 2 = 22.00$ , and  $4 + 2 = 6$ ,  $22.00 + 11.00 = 33.00$   
 $10 + 6 = 16$ ,  $55.00 + 33.00 = 88.00$ .

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Date: 2006-02-05 09:43:13

Hi Alice,

Thanks for working on your solution more. I really like the parts where you write "he realized..." and "he doubled..." because those words in between your arithmetic help the reader know why you did certain calculations.

It would be great if you could add a few more thoughts to the last part of your solution.

I hope to hear from you soon.

Shirley

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From: Alice

Date: 2006-02-15 16:25:02

Richard was trying to get from 1 to 16. So he did.....  $1 * 10 = 10$  and  $5.50 * 10 = 55.00$ . Next he realized he needed to get 6. So he doubled 1 and got 2,  $5.50 * 2 = 11.00$ . He doubled 2 and got 4, and  $11.00 * 2 = 22.00$ , and  $4 + 2 = 6$ ,  $22.00 + 11.00 = 33.00$   
 $10 + 6 = 16$ ,  $55.00 + 33.00 = 88.00$ . So this is how he got the 16 and the 88.00.

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Date: 2006-02-16 17:24:20

Hi Alice,

Thanks for working on the problem a little more. I was thinking that instead of writing ",and  $4+2=6$ ..." you might write it in words like, "He added the 4 and the 2 to get 6, and the cost of the tickets was  $11.00+22.00=33.00$ ." I guess I just liked the way you started out using words and numbers combined. I was hoping that you could do the second half of your solution similarly.

Does that make sense?

Shirley

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### E-A-G-L-E-S Eagles!

The following stem-and-leaf plot shows the number of points the Eagles scored during each of the 16 games of the 2005-2006 season. The stems represent 10's and the leaves represent 1's:

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0 | 0
1 | 0 0 0 7 7 9
2 | 0 0 0 1 1 3 3
3 | 7
4 | 2
```



Use the stem-and-leaf plot to answer the following questions about the Eagles' scoring this year. **Be sure to explain how you figure out your answers.**

1. What's the minimum score the Eagles had this year?
2. What's the maximum score the Eagles had this year?
3. What's the range of points the Eagles had this year?
4. What's the median number of points the Eagles scored per game?
5. What's the mode of the points the Eagles scored per game?
6. What's the mean number of points the Eagles scored per game?

**Challenge:** The following data shows the number of first downs the Eagles got during each of their 16 games this year:

**18, 30, 26, 25, 6, 22, 12, 17, 21, 20, 15, 11, 17, 13, 11, 18**

Create a stem-and-leaf plot showing the Eagles' first downs.

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From: Ariana

Date: 2006-03-20 16:28:32

1. The minimum is the number that is lowest of all of them which means it is 0
  2. The maximum is highest number of them all which mean it is 42.
  3. The range is the maximum minus the minimum which is 42.
  4. The median is the number in the middle which is 20
  5. The mode is the number that appears the most which is 10 and 20.
  6. The mean is all the numbers added up together and then divided by how many their are which mean that the mean is 19.13333.
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Date: 2006-03-21 22:49:45

Hi Ariana

Nice work on this problem! You've done a good job of explaining how you got your answers, and most of your answers are correct.

The only one I don't quite agree with is your mean of 19.13333. That's very close, but not quite right. What did you get when you added all the numbers up? And what did you divide by? Can you check that again and revise your answer to show me the actual calculation you made?

When you revise, would you like to try the Challenge question?

Great start - let's finish it up by working on that mean some more and maybe trying the Challenge!

-- Dan

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From: Ariana

Date: 2006-03-22 16:32:13

1. The minimum is the number that is lowest of all of them which means it is 0
2. The maximum is highest number of them all which mean it is 42.
3. The range is the maximum minus the minimum which is 42.
4. The median is the number in the middle which is 20
5. The mode is the number that appears the most which is 10 and 20.
6. The mean is all the numbers added up together and then divided by how many their are which mean that the mean is 19.375. When I added all the numbers together I got 310. Then I divided it by 16 and got 19.0375 .

Challenge:

- 0 6
- 1 1,1,2,3,5,7,7,8,8
- 2 0,1,2,5,6
- 3 0

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Date: 2006-03-28 11:46:41

Hi Ariana -

Thanks for revising and fixing up your mean calculation plus adding the challenge. Your challenge answer is perfect! It's clear to me that you really understand how stem-and-leaf plots work. Good job!

Your mean calculation is also correct now, with the numbers adding up to 310 and getting 19.375 when you divide by 16. You just have one little tiny typing mistake - in your last sentence you wrote 19.0375 instead of 19.375! Can you take a minute to revise and fix that up? Other than that one little thing, this is an excellent solution to this problem.

Great work!

-- Dan

## Falling Leaves

Last weekend I was watching leaves fall from a tree. As the wind picked up and the leaves fell faster, I noticed an interesting pattern:

The first minute, only one leaf fell. During each passing minute, the number of leaves that fell was equal to the total on the ground plus one.



If this pattern continued, how many leaves fell during the 12th minute? during the 24th minute?

**Extra:** Write an expression to represent how many leaves would fall during the nth minute.

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From: Chad  
Date: 2006-01-27 09:45:16

On the 12th minute it would have been 23 leaves that would of fell because for 11 minutes it would had been 22 leaves so you would add one more. On the 24th minute it would have been 46 leaves because i justed doulbed from 12 and got 46

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Date: 2006-01-28 10:07:25

Hi Chad,

Thanks for starting to work on this problem. I wonder if making a chart might help?

The problem says, "The first minute, only one leaf fell. During each passing minute, the number of leaves that fell was equal to the total on the ground plus one."

A chart might look like:

| minutes | fell | on the ground |
|---------|------|---------------|
| -----   | ---  | -----         |
| 1       | 1    | 1             |
| 2       |      |               |
| 3       |      |               |

How many leaves will fall during the second minute? How many leaves will be on the ground then?

Talk to you again soon.  
Sophia

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From: Chad  
Date: 2006-01-29 14:51:29

On the 12th minute 2048 or 2 to the 11th power fell. On the 24<sup>th</sup> minute 8,388,608 or 2 to the 23rd power fell.

I made a chart to the 12th minute then used the pattern to get the answer for the 24th minute.

| Minutes | Fell | Ground |
|---------|------|--------|
| 1       | 1    | 1      |
| 2       | 2    | 3      |
| 3       | 4    | 7      |
| 4       | 8    | 15     |
| 5       | 16   | 31     |
| 6       | 32   | 63     |
| 7       | 64   | 127    |
| 8       | 128  | 255    |
| 9       | 256  | 511    |
| 10      | 512  | 1023   |
| 11      | 1024 | 2047   |
| 12      | 2048 | 2095   |

Extra Credit

number of falling leaves per minunte = 2(to the power of number of minutes-1)

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Date: 2006-01-29 16:39:43

Hi Chad,

Thanks for working on the problem more! You've done a great job to improve your solution.

There are a few minor things to consider this time. One, is that you might like to use the "power" notation that we use when typing. You can type  $2^{11}$  instead of "2 to the 11th power." In your chart you might want to reconsider the number of leaves that you've listed for the "Ground" at the 12th minute.

It would be interesting, too, if you could explain how you saw the pattern. Is there anything that helped? (I'm just thinking that if another student reads your solution, anything you can explain to help them see what you see would be good.)

Talk to you again soon.

Sophia

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## Don't Spill the Soup

Suppose you have two cans of the same size that are partially filled with soup. One can is  $\frac{1}{3}$  full, and the other one is  $\frac{1}{2}$  full. You want to pour the soup from the two cans into one empty can of the same size.



### Questions:

1. Will one can hold all of this soup?
  2. How do you know?
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From: Cameron

Date: 2006-02-18 10:06:33

Yes. All of the soup will fit into one can. I know because I added  $\frac{1}{3} + \frac{1}{2}$  and came up with  $\frac{5}{6}$ . If the can is the same size as the other 2 then it will fit.

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Date: 2006-02-18 22:15:08

Hi Cameron,

Thanks for starting to work on this problem. How did you add  $\frac{1}{3}$  and  $\frac{1}{2}$  and get  $\frac{5}{6}$ ? Can you explain that? How do you know that  $\frac{5}{6}$  will fit?

Talk to you again soon.

Alysa

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From: Cameron

Date: 2006-02-20 22:00:14

Yes. All of the soup will fit into one can. I know because I added  $\frac{1}{3} + \frac{1}{2}$  and came up with  $\frac{5}{6}$ . If the can is the same size as the other 2 then it will fit.

I made a common denominator of  $\frac{1}{3}$  and  $\frac{1}{2}$  by multiplying  $\frac{1}{3} \times \frac{2}{2}$  and  $\frac{1}{2} \times \frac{3}{3}$ . Then I added the fractions.

$$\frac{1}{3} \times \frac{2}{2} = \frac{2}{6} \quad \frac{1}{2} \times \frac{3}{3} = \frac{3}{6} \quad \frac{2}{6} + \frac{3}{6} = \frac{5}{6}$$

I know that it will fit into the can because the whole can is  $\frac{6}{6}$  and  $\frac{5}{6}$  is less than  $\frac{6}{6}$ .

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Date: 2006-02-21 12:08:38

Hi Cameron,

Thanks so much for adding all of those details to your solution. Great job!

Keep on problem solving.

Alysa

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## Cereal Consumption Comparison



Mikey and Lily eat different kinds of cereal but their cereals come in the same size box. Every day Lily has the same big bowl of cereal and she eats four times as much as Mikey. On Monday Lily starts with a new box and Mikey still has half a box to finish. Later in the week it looks like they have the same amount left in their boxes. How much of each box has cereal in it?

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From: Sasha

Date: 2006-02-06 12:04:23

Answer:  $\frac{1}{6}$  box is full

Explanation:

I set the equations  $1 - 4x$  and  $.5 - x$  since the amount left in the boxes is the same after a few days. I solved the equation and the answer was  $\frac{1}{6}$ , therefore,  $\frac{1}{6}$  of the boxes are full when they each have the same amount.

Actual written comment: if I want to know when the boxes have the same amount of cereal, why wouldn't I set the two equations representing how the cereal is being used equal to each other to obtain an answer?

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Date: 2006-02-08 21:37:43

Hi Sasha,

I think it does make sense to make equations that you set equal to each other. You don't really show your work or explain the equations that you setup. That would help, but I think you are doing very nice work here.

Perhaps most importantly, you probably want to think about what your result of  $\frac{1}{6}$  represents. What is "x" in your equation? And how will this x help you figure out how much cereal is left in each box?

I look forward to reading a revised solution.

-- Tyrone

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From: Sasha

Date: 2006-02-09 10:47:46

Answer: 1/3 of both the boxes is left.

Explanation: I set the equations  $1 - 4x$  and  $.5 - x$  since the amount left in the boxes is the same after a few days. I solved the equation and the answer was  $x = 1/6$ . Since  $X = 1/6$ , I substituted the value into each equation and I see that the quantity on each side of the equal symbols is  $1/3$ . My solution:

$$1 - 4 * X = .5 - X$$

$$1 - 4 * 1/6 = .5 - 1/6$$

$$1 - 4/6 = .5 - 1/6$$

$$1 - 2/3 = 3/6 - 1/6$$

$$\text{and finally, } 2/6 = 2/6 \text{ or } 1/3 = 1/3$$

Thank you for your hints!

Date: 2006-02-09 12:31:26

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Hi Sasha,

Substituting the result back in was a good way to find the answer. It also works well to see your calculations written out so completely and nicely.

I am guessing that on the PSSA you can get a better score if you also say what your expressions and equations mean. These are things which are obvious to you, so you don't usually bother.

For example: where did  $1-4x$  come from and what does it represent? Clearly you know, but if you had written it out, and if you had written out what "x" represents, then, not only would you get a better score, but you might have realized your error without any hints. Right?

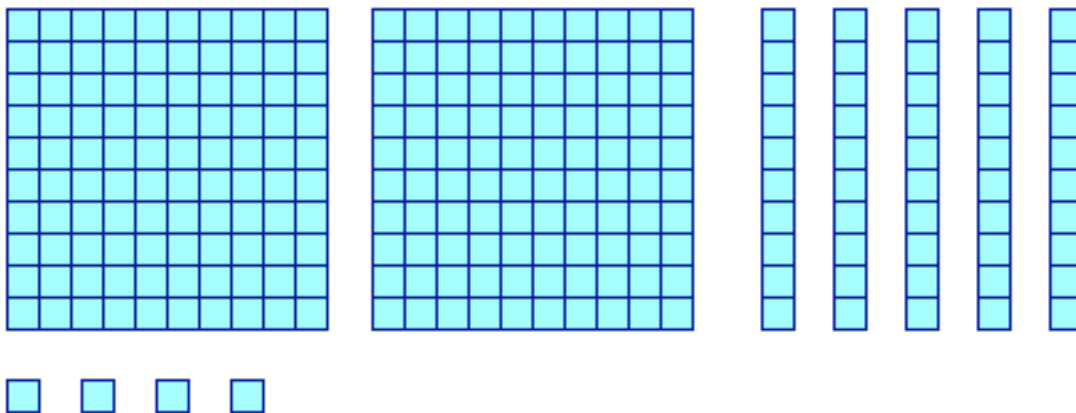
This is the one of the main reasons mathematicians write everything out. When they do, they see things that they missed. And it makes easier for other people to add ideas as well.

Thank you so much for doing this problem-solving with me. I look forward to more.

-- Tyrone

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## What Number Am I?



What number does the above picture stand for? How do you know?

**Challenge:** Each letter stands for a number:

$$X = 1 \quad Y = 10 \quad Z = 100$$

What number does this stand for?

$$ZZ \ YYYYYY \ XXX$$

How do you know?

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From: Lela

Date: 2006-03-17 11:59:50

To figure out the answer you had to add  $200+50+3$  which  $=253$ . Therefore the answer is 253.

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Date: 2006-03-17 12:27:48

Hi, Lela. Great job finding the answer! You are right on.

Could you explain how you knew it was 200, 50, and 3? What would you tell a classmate who can't solve the problem?

Adding that will make your explanation stronger.

- Nadine

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From: Lela

Date: 2006-03-22 11:10:28

I would tell him/her that one flat = 100 one long = 10 and cube = 1. To figure out the answer I had add  $z+z+y+y+y+y+y+x+x+x$ . Since one  $z=100$  one  $y = 10$  one  $x = 1$ , and there're two  $z$ 's which = 200 five  $y$ 's which = 50 three  $x$ 's = 3. Therefore  $200 + 50 + 3 = 253$ .

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Date: 2006-03-22 12:34:50

Hi, Lela. That's super! Thanks for working on it some more. What you have added would really help another student understand.

- Nadine