Monday cup #11- Solution

Posted on: June 10, 2019
Due on: June *16*, 2019

Problem

Lower Elementary:

Question: a fish "Salmon" was caught whos tail weighs 9 pounds. His head weighed as much as his tail and half his body,and his body weighs as much as his head and his tail. how much does the fish "Salmon" weigh

Upper Elementary:

Question: What number is exactly between 1/7 and 2/7?

Middle School:

Question: you glance at the clock, Before you go out to lunch the cafe, . When you come back from lunch,

you **glance at the clock** again, and you notice something strange: the minute and the hour hand have exchanged places from the positions they had just before you went to lunch.
The question is: how long were you away?

Algebra and Up:

Question: An ordinary 3X3 magic square contains every positive integer from 1 through 9,with one integer per cell, such that the sums of the numbers in each row, each column and each diagonal are the same. When the ordinary magic square shown is completed, what is the sum of all the possible values of x?

	x	
	5	
		$x+1$

There were correct solutions from Gigi zakaradze (Georgia, the country).
The prize was split between zakaradze

Rules

1. Anyone is eligible to participate. Each solution is to be the work of one individual without any input from faculty or others. An answer must be accompanied by appropriate justifications to be considered correct.
2. The solution is to be submitted with the solver's name, email, year in school (if applicable), local phone number, and local address. If you are submitting this for possible credit in a class, include your class number and instructors name.
3. The solution is to be typed or legibly written. Solutions must be submitted to the by 2 p.m. on the due date.
4. Entries will be graded on clarity of exposition and elegance of solution. An award of GEL10 will be given for the best correct solution. In the case of a two-way tie, the award will be split. If there are more than two best solutions, a drawing will be held to determine two award winners.
5. Graduate students, faculty, and members of the general public are encouraged to submit solutions, but they will not be considered.

ორშაბათის თასი, кубок понедельника, Monday cup, Coppa del lunedì, Coupe du lundi
Solution for this problem can be submitted proveweek@gmail.com

Lower Elementary:

Question: a fish "Salmon" was caught whos tail weighs 9 pounds. His head weighed as much as his tail and half his body,and his body weighs as much as his head and his tail. how much does the fish "Salmon" weigh

Answer: so the body weighs 36 pounds, the head weighs 27 pounds and the tail weighs 9 pounds the fish (in total) weighed 72 pounds That is certainly a whopper!

Solution: (Scroll Down for Answer!)Did you know that Algebra.Com has hundreds of free volunteer tutors who help people with math homework? Anyone can ask a math question, and most questions get answers!OR get immediate PAID help on:
Type Your Question
Go!!!
Answer by Abbey(339) About Me (Show Source):
You can put this solution on YOUR website!
let's break this apart into manageable pieces:
a fish was caught whos tail weighs 9 pounds.
Let the Tail (T) = 9 pounds
His head weighed as much as his tail and half his body,
Head (H) = T + 1/2 Body (B)
H=9+B/2
and his body weighs as much as his head and his tail.
B=H+T
B=H+9

how much does the fish weigh

since we know that the head =9+b/2, we can substitute into our second equation:
B=9+b/2+9
B=18+b/2
b-b/2=18
b/2=18
b=36
so the body weighs 36 pounds,
the head weighs 27 pounds
and the tail weighs 9 pounds
the fish (in total) weighed 72 pounds
That is certainly a whopper!

Upper Elementary:

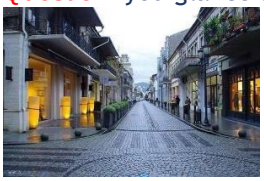
Question: What number is exactly between 1/7 and 2/7?

Answer: Three-fourteenths

Solution: There aren't any whole sevenths between one-seventh and two-seventh, so let's turn them into fourteenths: $^1/_7 = {}^2/_{14}$, and $^2/_7 = {}^4/_{14}$. So, since 3 is exactly between 2 and 4, three-fourteenths must be the number that is exactly between one-seventh and two-sevenths.

Middle School:

Question: you glance at the clock, Before you go out to lunch the cafe, . When you come back from lunch,



you **glance at the clock** again, and you notice something strange: the minute and the hour hand have exchanged places from the positions they had just before you went to lunch.
The question is: how long were you away?

Answer: **55 and 55/143 minutes**

Solution: The problem, once again, reads as follows. Before you go out to lunch, you glance at the clock above your desk. When you come back from lunch, you glance at the clock again, and you notice something strange: the minute and the hour hand have exchanged places from the positions they had just before you went to lunch.

The question is: how long were you away?

I received several answers to this problem, but the first person who got it right was Adrian W. Langman, of Port Angeles, TX.

Here is Adrian's answer, in his own words:

It's probably true that the hour hand is near the 12 at the beginning and near the 1 at the end. So it's about 5 minutes after noon at the beginning, and just a bit after 1 at the end.

(Or, it could be a tad before 11 in the morning at the beginning, and about 5 minutes before noon at the end, if the worker is an early riser. But this problem is just the geometric mirror image of the one hypothesized above, so the duration of the lunch break will be exactly the same.)

Obviously the lunch break is about 55 minutes. But to find the exact length, let M be the number of minutes past noon at the beginning. I'll use the obvious coordinate system – the origin at the center of the clock, the clock hands radial lines, the 12 at 0 degrees, and the 3 at 90 degrees.

At M minutes past noon, the minute hand is at M/60 x 360 degrees, i.e. 6M degrees, and the hour hand is at M/60 x 30 degrees (since it's M/60 of the way from the 12 to the 1, which is at 30 degrees), i.e. M/2 degrees.

So at the end of lunch, since they've switched places, the hour hand is at 6M degrees and the minute hand is at M/2 degrees.

Since the minute hand is at M/2 degrees, it is 1/6(M/2) minutes past 1 o'clock, i.e. M/12 minutes past 1 o'clock.

Since the hour hand is at 6M degrees, it's at 6M-30 degrees past the numeral 1, so it's 2(6M-30) minutes after 1o'clcock.

Setting M/12 = 2(6M-30) and solving for M yields 720/143 (which is approximately 5.035).

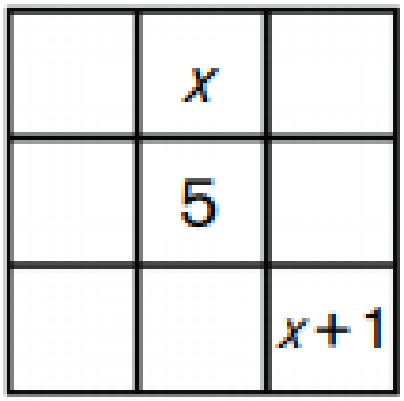
So you left at 720/143 minutes after 12, and returned at 60/143 minutes after 1 o'clock.

So you were gone for 60 + 60/143 – 720/143 minutes,

i.e. 7920/143 minutes, i.e. **55 and 55/143 minutes**, which reduces to 55 and 5/13 minutes.

Algebra and Up:

Question: An ordinary 3X3 magic square contains every positive integer from 1 through 9,with one integer per cell, such that the sums of the numbers in each row, each column and each diagonal are the same. When the ordinary magic square shown is completed, what is the sum of all the possible values of x?



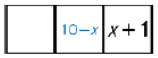
Answer:

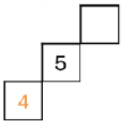
Solution:

The sum of the elements in each row, column and diagonal of a 3-by-3 magic square must equal (1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9)/3 = (9 × 10)/(2 × 3) = 15.

For the values in the center column to add to 15, the bottom cell must have value 15 − (x + 5) = 15 − x − 5 = 10 − x.

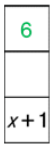
Then, for the values in the bottom row to add to 15, the left cell must have value 15 − (10 − x + x + 1) = 15 − 11 = 4.

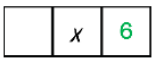




Next, for the values along the diagonal from the bottom-left to the top-right to add to 15, the top-right cell must have value 15 − (4 + 5) = 15 − 9 = 6.

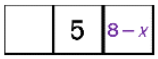
Then for the values in the right column to add to 15, the middle right cell must have value 15 − (6 + x + 1) = 15 − 7 − x = 8 − x.





Next, for the values in the top row to add to 15, the left cell must have value 15 − (x + 6) = 15 − x − 6 = 9 − x.

Lastly, for the cells of the middle row to add to 15, the left cell must have value 15 − (5 + 8 − x) = 15 − 13 + x = x + 2.



*Now we see three sets of 3 consecutive values: x, x + 1, x + 2; and 4, 5, 6; and 8 − x, 9 − x, 10 − x. Either one of the sets containing the unknown must be 1, 2, 3 and the other must be 7, 8, 9. Since x is the least value in its set, it follows that x can be either 1 or 7, the sum of which is 1 + 7 = **8**.*

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