



Problem of the Week

Problem A and Solution

Screen Time vs. Play Time

Problem

Xiao wanted to figure out how much time she spends doing activities outside compared to how much time she spends using a computer. She kept track of her activities over two days. This was what she recorded:

Day 1

A	8:30 a.m.	to	9:00 a.m.	Played outside before school.
B	9:45 a.m.	to	10:10 a.m.	Used the computer during math class.
C	10:30 a.m.	to	10:45 a.m.	Played outside during recess.
D	12:30 p.m.	to	1:00 p.m.	Played outside during lunch break.
E	1:20 p.m.	to	1:40 p.m.	Used the computer during French class.
F	2:00 p.m.	to	2:15 p.m.	Played outside during recess.
G	5:15 p.m.	to	6:15 p.m.	Did homework on the computer

Day 2

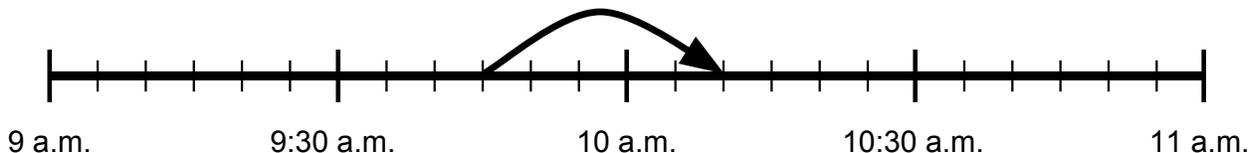
H	10:00 a.m.	to	10:45 a.m.	Went for a bike ride with her friends.
I	1:10 p.m.	to	2:20 p.m.	Went for a hike with her aunt.
J	3:30 p.m.	to	5:15 p.m.	Watched a movie on the computer.

Did Xiao spend more time outside or using the computer over the two days? Justify your answer.

Solution

One way to determine the answer is to calculate the total number of minutes Xiao spent on each kind of activity. We can calculate the amount of time each activity takes by using a number line.

For example, to calculate how much time elapsed when Xiao used the computer during math class, we can create a number line representing the times from 9:00 a.m. until 11:00 a.m., showing intervals of 5 minutes each.



From this number line, we skip count by five: $5, 10, 15, 20, 25$, to see that she spends 25 minutes on the computer during that time.





We could draw a number line to calculate each of the intervals that Xiao recorded. Here is a table that shows how many minutes she spent on the computer:

Activity	Minutes Elapsed
B	25
E	20
G	60
J	105

This is a total of $25 + 20 + 60 + 105 = 210$ minutes.

Here is a table that shows how many minutes she spent outside:

Activity	Minutes Elapsed
A	30
C	15
D	30
F	15
H	45
I	70

This is a total of $30 + 15 + 30 + 15 + 45 + 70 = 205$ minutes.

So Xiao spent 5 more minutes on the computer than she spent outside during those two days.





Teacher's Notes

When we think about calculating elapsed time, we normally count the minutes from the start time until the end time. When we think about calculating the difference between two numbers we usually subtract the smaller number from the larger number. If we use a number line to calculate the time spent on each activity, we can do this by determining the length of the line segment between the time the activity started and the time it ended. It does not matter if we measure this length from the start to the end or from the end to the start. We refer to this length as the magnitude of the number.

In mathematics, if we only care about the size of a number, and not its sign, we would be interested in the *absolute value* of that number. The absolute value of a number is denoted with vertical bars like this: $|x|$. So $|-4| = 4$ and $|12| = 12$.

In general, if we want to know an interval between two numbers x and y we would calculate $|x - y|$. The result will always be a non-negative number whether $x \geq y$ or $y \geq x$.

