

Michael, age 12, Practitioner

On Monday, Angela ate 8 grapes.

I drew out a timeline, Monday-Friday, picked a logical number for Friday and subtracted 6 from that number for each day and added them together. I repeated the process until the total came to 100.

Michael's clever guess-and-test begins with Friday and works backward. To make his solution complete, he needs to show some of his tests and tell how he adjusted his guesses.

Megan, age 11, Practitioner

The total number of grapes Angela ate on Monday was 8 grapes.

First I substituted the number of grapes Angela ate on Monday with x . Then for Tuesday I put $x+6$, Wednesday $x+12$ because you are adding 6 Tuesday then 12 Wednesday then Thursday you have to add $x+18$ because since the number x is representing isn't changing yet because we don't know what x represents you just add six to the number you added before. Friday you would add x and 24. Then you have to add the numbers up. $6+12+18+24=60$. To find out how many grapes Angela ate Monday you have to do $60+(5 \times _) = 100$. To find what blank equals which is the number of grapes Angela ate on Monday you have to divide 40 by 5 because if you subtract 60 from 100 you get 40. The answer to the division problem is 8, the number of grapes Angela ate on Monday.

I doubt that Megan has been introduced to formal algebra, but she exhibits good algebraic thinking. It's always a good idea to verify algebraic solutions by testing the numbers in the original problem. A list of the grapes eaten each day would do that.

Paul, age 11, Expert

Angela ate 8 grapes on Monday.

She ate 8 grapes on Monday. She ate 8 because each day after Monday she ate 6 more grapes than the day before. So on Tuesday she ate 14 grapes ($8+6=14$). On Wednesday she ate 6 more grapes than she did on Tuesday so she ate 20 grapes because $14+6=20$. So far she's eaten 42 grapes. On Thursday she ate 6 more grapes than she ate on Wednesday so she ate 26 grapes because $20+6=26$. So far she's eaten 68 grapes. On Friday she ate 6 more grapes than Thursday so she ate 32 grapes because on Thursday she ate 26 grapes and $26+6=32$. Since Friday was the last day she has eaten 100 grapes because if you add up all the numbers (8,14,20,26,32) you get 100.

She would eat her 300th grape on the 10th day because in 5 more days she'll have eaten 350 grapes which is more than 300. She would eat her 300th grape on the 10th day because if she keeps eating 6 more grapes each day on the 6th day she'll eat 38 grapes, the next day 44 grapes, the day after that 50 grapes, then 56 grapes, and finally on the 10th day she'll eat 62 grapes. If you add it all up you'll get 350. It has to be 350 and not 300 because if you subtract one day, the last day which is 62 grapes, she'll only have eaten 288 grapes which is less than 300.

Paul does a fine job of verifying his answer and convincing us that he is correct. Since he fails to explain how he found his answer, his solution is not complete, but he does show good understanding of the key math ideas of the problem. That, along with his demonstrated grasp of the Extra earns him Expert in Interpretation.

To encourage him to improve his Completeness score, I'd ask how he arrived at 8 in the first place.

Scoring Rubric

A **problem-specific rubric** can be found linked from the problem to help in assessing student solutions. We consider each category separately when evaluating the students' work, thereby providing more focused information regarding the strengths and weaknesses in the work. A **generic student-friendly rubric** can be downloaded from the [Teaching with PoWs](#) link in the left menu (when you are logged in). We encourage you to share it with your students to help them understand our criteria for good problem solving and communication.

We hope these packets are useful in helping you make the most of Math Fundamentals Problems of the Week. Please let me know if you have ideas for making them more useful.

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