

Mystery at the Mansion

One of the guests at Math Mansion has stolen all of the cupcakes for Addison's birthday party. Help figure out who did it by using your knowledge of order of operations so that all the party guests will still get a cupcake!

The guests at the party are: Sarah, Kasen, Zoey, Jimmy, Grace, and Billy. One of them is the person that stole the cupcakes. To start off, list the order of operations using the initials below to help get you started.

P

E

M

D

A

S

Is multiplication always done before division? Explain your answer.



Who are our suspects?

The guests at the party are: Sarah, Kasen, Zoey, Jimmy, Grace, and Billy. One of them is the person that stole the cupcakes. You can help narrow down the suspects by looking at the following descriptions. Anyone who is incorrect on how you use order of operations stays on the suspect list. Good luck detective!

Sarah: "You should always do the part of the problem that is in parenthesis first."

Zoey: "Subtraction is always done last."

Jimmy: "Multiplication is the most important part of any problem."

Grace: "Addition is always found in the beginning of the problem."

Kasen: "Sometimes multiplication will be done before division and sometimes division would be done before multiplication. It depends how the problem is written."

Billy: "When you do division is not important. The answer would be the same no matter when you do it."

Continue for questions →

Who are our suspects?

Directions: Look at each suspect and tell me if their statement about order of operations was correct or incorrect. If it was incorrect, explain why.

Sarah: _____

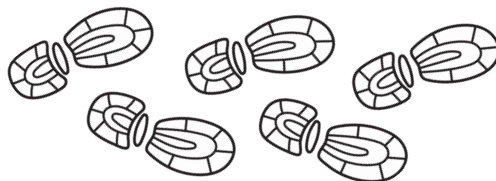
Zoey: _____

Jimmy: _____

Grace: _____

Kasen: _____

Billy: _____



Who is correct and no longer a suspect? Cross them off the list



Sprinkles Everywhere!

1. Sarah found 3 sprinkles on the floor, 3 more sprinkles on the stairs and then ℓ sprinkles on the counter. Zoey found 10 sprinkles by the refrigerator and another 10 by the door. Sarah wrote out this problem to solve how many sprinkles they found total: $3+3+\ell+(10 \times 2)=?$ Zoey wrote out this problem: $10+10+3 \times (2+\ell)=?$ (The \times in this problem is a multiplication sign)
What would the answers be for each problem? Show your work.

Who was correct in their thinking, Sarah or Zoey? Why? Explain what the incorrect person did wrong using your knowledge of order of operations.

The person that is correct gets crossed off the list

2. Billy saw 8 sprinkles by the couch, but when he went back to check 3 of them were gone. He also found 5 by a lamp, 5 by the TV, and 5 by the refrigerator. He wrote out the problem $8-3+5 \times 3=?$ Billy thinks the answer is 20 but Grace thinks it is 30. Who is correct? Show your work and explain what the incorrect person did wrong.

The person that is correct gets crossed off the list

3. Jimmy found 9 sprinkles in 3 different places and 5 more by the door. He says he found 32 total. Write out a problem using order of operations that would get you that answer.

The person that is correct gets crossed off the list, was Jimmy correct?



The Final Suspects

You have narrowed it down to two suspects based on their knowledge of order of operations. You decide to give them a little quiz to see who gets the most answers right. Look at the following problems and figure out who is right and who is wrong.

You decide who is suspect #1 and who is suspect #2 from who is left on the list. Write their names and which suspect they are.

1. $8 + 9 \times (14 - 8) = ?$

(The x in this problem is a multiplication sign)

Suspect #1- 62

Suspect #2- 102

2. $6 - 4 - 2 + 15 \div 3 = ?$

Suspect #1- 5

Suspect #2- 9

3. $99 + 3^2 \times 7 - 11 = ?$

Suspect #1- 745

Suspect #2- 151

4. $(8 + 26) - 3 \times 5 = ?$

Suspect #1- 19

Suspect #2- 155

5. $(6-2)^3 + 9 \times 9 - 10 = ?$

Suspect #1- 83

Suspect #2- 135

