**Problem:**

Emmanuel added two integers. For each condition, identify whether the sum would be negative, positive, or zero. Explain your reasoning for each answer.

1. Two integers that have negative values.
2. Two integers that have positive values.
3. One integer has a positive value, and one integer has a negative value.
4. The values of the two integers are opposites.

**After reading the problem, consider the following:**

* What skills/knowledge do students need to answer this correctly?
* What vocabulary do students need to understand?
* What misconceptions do you anticipate?

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| **Sample MWA Student Response A:**   1. Two negative integers make a positive integer because the cancel. 2. Two positive integers make a positive integer. 3. One positive and one negative make a negative because the negative is stronger. 4. Opposites make a negative because the negative is stronger. |
| **Sample MWA Student Response B:**   1. A negative and a negative is a negative. 2. A positive and a positive is a positive 3. A negative and a positive is a negative 4. An opposite and an opposite are negative |
| **Sample MWA Student Response C:**   1. Adding negatives cancel and make a positive 2. Adding positives are positive because there are no negatives 3. Adding a positive and a negative is still negative because that is the rule 4. An opposite has one negative and one positive so it is negative because the rule is that the negative number makes the answer negative. |
| **Exemplar Response (ANet Response/SBAC Level Response):**   1. Two integers that have negative values would result in a negative sum. For example, -3 + -4 = -7. When you add two negative integers, the result is negative regardless of the quantity of each integer. On a number line you would draw two arrows in the negative direction to represent the addition which would lead you further in the negative direction for the sum. 2. To positive integers will always result in a positive sum. For example, 3+4=7. The size of the integers does not matter, the sum will always be positive. On a number line you would draw two arrows in the positive direction to represent this addition which lead you further in the positive direction for the sum. 3. When adding a positive and negative integer the sign of the sum depends on the problem. For example 3+-4=(-1) and (-3)+4=1. When adding opposite signed integers, if the positive number is greater then the sum will be positive. On a number line representing this situation the positive arrow would be longer than the negative arrow, and therefore the sum would be on the positive side of the number line. If the negative number is greater than the sum will be negative. On a number line representing this situation the negative arrow would be longer than the positive arrow and therefore the sum would end up in the negative side of the number line. 4. Opposites are also known as additive inverses and their sum is always 0. For example 5 + (-5) = 0. This is always true when adding opposites. On a number line, you would have two equidistant arrows facing opposite directions and therefore will always result in a sum of 0. |