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|  | **Integers: Operations with Signed Numbers**  ***Before* you do ANY computation, determine the OPERATION!  Then follow the instructions for *THAT* operation.**     |  |  | | --- | --- | | |  | | --- | | ADDITION | |      |  |  |  |  |  | | --- | --- | --- | --- | --- | | Do the numbers have the ***SAME*** SIGN? | | | | | | ***YES -*** | Same Signs:  Find the **SUM:** |  | ***NO -*** | Different signs:  Find the **DIFFERENCE:** | | (-3) + (**-6**) = (**-**9)   (+4) + (**+5**) = (**+**9) | |  | (+5) + (**-7**) = (**-**2)   (-4) + (**+6**) = (**+**2) | | | **Either way:   Keep the sign of the *LARGER*\* number.** | | | | |   **\*** *"LARGER"* is used here as a quick (but mathematically imprecise) way to describe the integer with the greater **Absolute Value** (ie. distance from zero). In each of the examples above, the SECOND integer has a greater **Absolute Value**.   |  |  | | --- | --- | | |  | | --- | | SUBTRACTION | |   **First, change the SUBTRACTION problem to an ADDITION problem;**  **Then, follow the rules (above) for solving the new *ADDITION* problem.**  **(-6) - (+2) =**   |  |  |  | | --- | --- | --- | | First, copy the problem *exactly*.  1. The first number stays the same.  2. Change the operation.  3. Switch the **NEXT SIGN.**  4. Follow the rules for addition. |  | (-6) - (+2) =  (-6)  (-6) +  (-6) + (-2)  (-6) + (-2) = (-8) | | Subtract means:  ***Add*** the ***opposite***. | (+2) - (-6) =  (+2) + (+6) = (+8) | | Subtract means:  ***Add*** the ***opposite***. | (-7) - (-3) =  (-7) + (+3) = (-4) | | Subtract means:  ***Add*** the ***opposite***. | (+4) - (+9) =  (+4) + (-9) = (-5) |      |  |  | | --- | --- | | |  | | --- | | MULTIPLICATION OR DIVISION | |   First, **DO** the multiplication or division.   Then determine the sign:   Count the number of ***negative*** signs....  Are there an ***EVEN*** number of ***negative*** signs?   |  |  |  | | --- | --- | --- | | **YES** | (an ***EVEN*** number of ***negative*** signs) | the answer is **POSITIVE** | | **NO** | (an ODD number of ***negative*** signs) | the answer is **NEGATIVE** |  |  |  |  | | --- | --- | --- | | First, copy the problem *exactly*. |  | (-2)  (-4)  (-6) = | | **DO** the multiplication or division. |  | |2|  |4|  |6| = |48| | | Count the number of ***negative*** signs....  Determine the sign of the answer: |  | (**-**2)  (**-**4)  (**-**6) = | | Are there an EVEN number of negatives?  If *YES*, the answer is POSITIVE  otherwise, the answer is negative. |  | A total of *THREE NEGATIVES*  Three is *NOT EVEN*   (it's odd).  So the answer is *NEGATIVE*  **-**48 |  |  |  |  |  |  | | --- | --- | --- | --- | --- | | (4) ÷ (2)  (6) = 12  A total of *ZERO NEGATIVES*  Zero *IS EVEN* .  So the answer is *POSITIVE* |  | (4) ÷ (**-**2)  (6) = **-**12  A total of *ONE NEGATIVE*  One is *NOT EVEN* (it's odd).  So the answer is *NEGATIVE* |  | (**-**4) ÷ (2)  (**-**6) = 12  A total of *TWO NEGATIVES*  TWO *IS EVEN* .  So the answer is *POSITIVE* |   **Another way of thinking of it:**   |  |  | | --- | --- | | |  | | --- | | **The Party in Mathland**  Have you ever been to a party like this?   Everyone is happy and having a good time (they are ALL POSITIVE). Suddenly, who should appear but the *GROUCH* (ONE NEGATIVE)! The grouch goes around complaining to everyone about the food, the music, the room temperature, the other people....   What happens to the party? Everyone feels a lot less happy... the party may be doomed!!  **ONE NEGATIVE MAKES *EVERYTHING* NEGATIVE**  But wait... is that *another* guest arriving?   What if *another* grouch (A SECOND NEGATIVE) appears? The two negative grouches pair up and gripe and moan *to each other* about what a horrible party it is and how miserable they are!! But look!! They are starting to smile; they're beginning to have a good time, themselves!!  **PAIRS OF NEGATIVES BECOME POSITIVE**  Now that the two grouches are together the rest of the people (who were really positive all along) become happy once again. The party is saved!!  **The moral of the story is that (at least in math, when multiplying or dividing) the number of positives don't matter, but watch out for those negatives!!   To determine whether the outcome will be positive or negative, count the number of negatives: If there are an even number of negatives *-and you can put them in pairs-* the answer will be positive, if not... it'll be negative:**  **Negatives in PAIRS are POSITIVE;  NOT in pairs, they're NEGATIVE.** | | |