Determine the Inverse of a Situation or Equation

We have already looked at writing inverses from a table of values, and graphing inverses. You can also write the inverse of a situation or of an equation, by doing the **opposite operation** in the **opposite order**.

EXAMPLES

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1st |  | 2nd |  | 2nd |  | 1st |
| The inverse of: | ***close*** *the door* | & | ***put the key in*** *the lock* | is: | ***take the key out*** *of the lock* | & | ***open*** *the door* |

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|  | 1st |  | 2nd |  | 2nd |  | 1st |
| The inverse of: | ***buy*** *a car* | & | ***answer*** *your phone* | is: | ***hang up*** *your phone* | & | ***sell*** *a car* |

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| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1st |  | 2nd |  | 2nd |  | 1st |
| The inverse of: | ***multiply*** *by 5* | & | ***subtract*** *2* | is: | ***add*** *2* | & | ***divide*** *by 5* |

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| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1st |  | 2nd |  | 2nd |  | 1st |
| The inverse of: | ***add*** *7* | & | ***multiply by*** *-8* | is: | ***divide*** *by -8* | & | ***subtract*** *7* |

**For each situation, write the inverse.**

1. The inverse of: “*turn on the TV and then sit down*” is: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

2. The inverse of: “*login to your email and then send a message* ” is: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

3. The inverse of: “*pick up your sister from school and then put on a jacket* ” is: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

4. The inverse of: “*multiply by ½ and then subtract 7*” is: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

5. The inverse of: “*square it and then multiply by 9* ” is: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

6. The inverse of: “*subtract 11 and then multiply by 4* ” is: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

7. The inverse of: “*multiply by 6 and then add 1* ” is: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**There are two ways to determine the inverse of an equation:**

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| **Method 1:** Use words to change it (like you did above). | **Method 2:** Switch *x* and *y* in the equation (because they are inverses of each other), and then solve for *y*. |
| How: Write the equation in words, find the inverse, and then re-write the equation.  EXAMPLE: Determine the inverse of:  **In words:** *To find y, multiply by 2 and then subtract 4.*  **Inverse in words:** *To find y, add 4 and then divide by 2*  **Inverse as an equation:**  **Check the result:**  If I did it correctly, plugging the new equation into the *x* of the old one will make    It’s correct! | How: Re-write the equation with *x* in *y’*s place and *y* in *x*’s. Then, use your operations to make it “”.  EXAMPLE: Determine the inverse of:  **Invert variables:**  **Solve for *y*:**  **Flip the equation:**  **Check:**  It’s correct! |

**Determine the inverse of each equation (use the method you prefer), and check if plugging one equation into the other will create .**

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| 8.  Check by plugging the new one in for *x* in the old one: | 9.  Check: | Check: |
| 11. | 12. | Check: |
| 14. | 15. |  |
|  | 18. |  |