

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Period \_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_

“Choose any number. Multiply it by 2. Now divide the result by 2. What do you have?”

It’s not surprising that these steps give you back your original number.  
But as we make the trick more complicated, you can surprise plenty of people.

**Your job is to create your own “Mathemagic” trick.**

It might…

* always give you back the original number, **OR**
* always give back the same number, no matter what you started with.

You need to be sure to tell your friend about the **types of numbers** he or she can choose—Can it be negative? Can it be 0? Can it be a non‑integer? etc.

**You need to include:**

➀ a **description** of your trick  
(what you would tell a friend to do if you were trying the trick out on him or her),

➁ a **general, mathematical explanation** for why your trick works for *all* numbers  
(use a variable)

➂ an **example** of the trick “in action.”

**See the example on the back of this page.**

Your trick should use at least four of the following operations:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | add | subtract | multiply | divide | square | square root |  |

Your trick will be more exciting if you *don’t*  undo everything backwards from how you did it originally. For instance, “add 4, square it, take the square root, subtract 4” isn’t very exciting. Use other properties of equality (like the distributive property) to make the trick “trickier.” See the example on the back of this page for an example of a better trick.



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Don’t steal this one—make yours different!

|  |  |  |  |
| --- | --- | --- | --- |
| **Operation** | **Step** | **General** | **Example** |
|  | Choose any nonnegative number. | *x* | 15 |
| (square) | Square your number. | (*x*) 2  = *x*2 | 152  = 225 |
| (multiply) | Multiply the result by 9. | *x* 2 ∙ 9  = 9*x* 2 | 225 ⬝ 9  = 2025 |
| (square root) | Take the square root of the result. | = 3*x* | = 45 |
| (add) | Add 15 to the result. | 3*x* + 15  = 3*x* + 15 | 45 + 15  = 60 |
| (divide) | Divide the result by 3. | = *x* + 5 | 60 ÷ 3  = 20 |
| (subtract) | Subtract 5. | *x* + 5 – 5  = *x* | 20 – 5  = 15 |
|  | It’s your original number! | *x*  (Yeah!) | 15 (Yeah!) |



|  |  |  |  |
| --- | --- | --- | --- |
|  | **Excellent** | **Acceptable** | **Unacceptable** |
| **Correctness of Trick**  **(10 points)** | * **You have correctly shown why your trick works (using variables).** | * Your trick has a few minor errors. | * Your trick has major errors. |
| * Your trick gives the desired result for *any* number you tell your audience they can choose. (i.e., the **domain** is correct) | * Your trick works for only *some* numbers in your domain (or you didn’t “warn” your audience). | * Your trick works for only *some* numbers or *no* numbers in your domain (or you didn’t “warn” your audience). |
| (8 – 10 points) | (4 – 7 points) | (0 – 3 points) |
| **Complexity of Trick**  **(6 points)** | * Your trick involves several steps that are complicated enough that your audience would be surprised. | * You have several steps, but they aren’t complicated enough to trick an audience. | * Your trick involves only a few steps, and they aren’t complicated enough to trick an audience. |
| * You used four or more different operations. | * You used only three different operations. | * You used two or fewer different operations. |
| * Your trick is quite different from the example given. | * Your trick is somewhat similar to the example given. | * Your trick is very similar to the example given. |
| (5 – 6 points) | (3 – 4 points) | (0 – 2 points) |
| **Correctness of Example**  **(4 points)** | * Each step of the example is done correctly. | * There are a few minor errors in your example. | * There are major errors in your example. |
| (3 – 4 points) | (2 points) | (0 – 1 point) |



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