

Magical Math Puzzles

NAME:

These magical math tricks are either bestowed by the universe with an impressive power or there is some trick. Can you figure out how they work?

1a.) Do the following trick with two different numbers.

	First example	Second example
step 1: Choose a number		
step 2: Find three times the number		
step 3: Add 6		
step 4: Divide by 3		
step 5: Subtract 2		

What will you always get as a result, in terms of the original number? Do more examples if you need.

Now, let's investigate this trick together. We will do this algebraically and also symbolically.

1b.) Assign a variable like x to represent the original number. Then perform the operations to this variable. Can you simplify your expression to show that it will always be equal to the number you proposed above?

1c.) Alongside the trick, write down the symbolic proof used to show that it will always work. We do this by using a little square (\square) to denote the original number and little circles (\circ) to denote numbers we add or subtract (like 6 or 2).

Steps of the Number Trick	Symbolic Proof
step 1: Choose a number	
step 2: Find three times the number	
step 3: Add 6	
step 4: Divide by 3	
step 5: Subtract 2	
The result is always the original number.	

2a.) Consider the following number trick. Use the trick on any two numbers you like. Show all of the steps of the trick.

	First example	Second example
step 1: Choose a number		
step 2: Double it.		
step 3: Add 8.		
step 4: Divide by 2.		
step 5: Subtract 3.		

What will you always get as a result, in terms of the original number? Do more examples if you need.

2b.) Alongside the trick, write down the symbolic proof used to show that it will always work. Use a little square (\square) to denote the original number and little circles (\circ) to denote numbers we add or subtract (like 8 or 3).

Steps of the Number Trick	Symbolic Proof
Choose a number.	
Double it.	
Add 8.	
Divide by 2.	
Subtract 3.	
The result is always 1 more than the original number.	

3.) We have used both inductive and deductive reasoning on this worksheet. Describe the difference between the reasoning you used on the first parts of each question (parts *a*) versus the reasoning you used on parts *b* and *c*. Which is inductive and which is deductive reasoning?