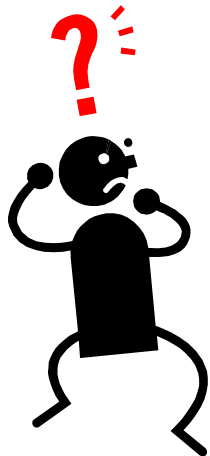## Mth 111 Number Tricks

To be mathematically literate it is imperative that you be able to effectively communicate mathematical concepts in a written fashion using correct mathematical notation. This assignment is one step in helping you become both more mathematically literate and review some mathematical concepts.

Pick a Number

Pick a number (any number) ...._____

Add 17 ...._____

Double the result ...._____

Now subtract 4 ...._____

Double the result again ...._____

Now add 20 ...._____

Divide the result by 4 ...._____

Finally subtract 20 ...._____

What do you get?   Can you say why?

Assignment

Try "Pick a Number" a few times. Do you always get the same result? Suppose you start with a negative number such as -7? How about a rational number (fraction) such as 3/5 or 1.27? What about beginning with an irrational number like π or $\sqrt{2}$? What about starting out with zero!

Determine how the above "number trick" works. Then write a paper (one page maximum) that outlines the above "trick" and then answers the question, "Why do you always get the same result?". Your paper must follow the guidelines given below. It will be graded on presentation, completeness, accuracy, punctuality and approach to the problem. It will be graded using the attached rubric which should be attached to your paper when submitted.

Guidelines

- Your paper must be typed or neatly handwritten
- Your paper must fit entirely on <u>one side of page</u>.
- Attach (staple) this page but all the pertinent information must be on your page.
- There should be a **Title** and 3 distinct sections: **Introduction, Solution, and Conclusion**.
- Your **Introduction** should introduce the "Number Trick" and include some human interest.
- Your **Introduction** should include a clear <u>problem statement</u> (your paper's purpose) *in your own words* so that someone not familiar with this assignment would understand the purpose of the paper.
- Your **Solution** should clearly show/describe how the trick works in <u>a step by step</u> process.
- Your **Conclusion** should summarize your results and refer back to the human interest in your **Introduction** to bring your paper full circle.

Mth 111 Grading Rubric   **NAME**

OVERALL FORMAT- Layout/Organization/Presentation

8 pts	*Typed with clearly readable font or neatly handwritten. Uses title and other clarifying headings. Layout and information organization/presentation flows for easy readability.*		
0 pts	*Readability is significantly hindered by font type, handwriting, layout and/or information presentation.*		
☐	Includes Title	☐	Spelling / Grammar / Vocabulary / Notation
☐	Includes Sub-Headings	☐	Appropriate Layout
☐	Appropriate use of White Space	☐	Easy on the Eyes / Overall Readability
☐	Rubric Attached	☐	Fits on One Page

INTRODUCTION

| 3 pts	*Clear, easy to read. Provides motivation, includes clear problem statement and flows naturally into the Solution. Makes the reader want to continue reading.*		
0 pts	*Quite confusing / disorganized. Motivation missing or unclear. Problem statement missing, awkward or incorrect. Makes the reader want to tear out their hair (even if they are already almost bald).*		
☐	Human Interest Included & Appealing	☐	Clear Problem Statement

SOLUTION

7 pts	*Processes/Strategies/Calculations used are easy to follow, accurate, complete and lead to a correct solution. Charts/tables enhance the paper.*		
0 pts	*Processes/Strategies/Calculations used are so unclear or contain substantial errors suggesting significant misunderstanding. The reader has now torn out all their hair and is screaming.*		
☐	Pick a number begins with 'x'	☐	Final result ends with 'x'
☐	Layout Enhances Explanation	☐	Appropriate Calculation Detail
☐	Clearly Marked Specific Steps	☐	Result Easily Identified & Correct

CONCLUSION/SUMMARY

| 2 pts	*Conclusion/Summary is easy to read and is consistent with the Introduction.*
0 pts	*Conclusion/Summary is missing, confusing or does not fit with the Introduction.*

The Magic of Mathematics
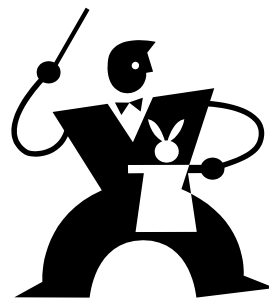
Title

Introduction
Houdini might roll over in his grave ….

Pick a number, any number and don't tell me what it is. It can be large or small, positive or negative, real or imaginary. Now add 17….

Question- How/why does this trick work?

Problem Statement- This paper shows….
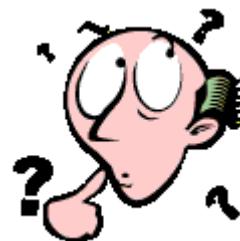
Introduction
w/ human interest and problem statement

Solution
Suppose we pick a number and call it "x" …

	Description	Mathematics	Explanation
Step 1	Pick a number	x	*x is a common choice for an arbitrary number*
Step 2	Add 17	x + 17	*...*
Step 3	Double your result	...	
...			
Step n	Simplify	x	*We get the number we started with*

Solution
in general terms

Special Casess
Suppose "x" is not a convenient number such as π? Will it still work?

Examples

Conclusion
…..   Look out Houdini, prepare to be dazzled!

Conclusion

Little Jack Horner   *Some fun with Mathematics*

Sits in the corner

Extracting cube roots to infinity.   Franz Helfenstein

An assignment for boys   Professor Mathematics

That will minimize noise   COCC

And provide a more peaceful vicinity.

What is it?

Pick any whole number, 1-99

Multiply by 3

Now, add all the individual digits (e.g. $762 \rightarrow 7 + 6 + 2 = 15$)

Multiply that number by 3

Add the individual digits again to obtain a single digit

Now, multiply by 3 and subtract 1.

Associate every letter of the alphabet with a letter: A=1, B=2, C=3 and so on. Determine the letter for your number. Think of an animal that begins with that letter. What is it?
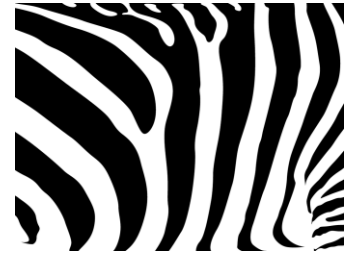
Geometry Made Easy

Area of square =_____

$A_1 =$ _____

$A_2 =$ _____

$A_3 =$ _____

$A_4 =$ _____

Sum A_1-A_4 = _____
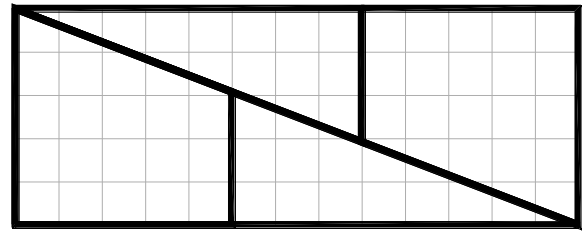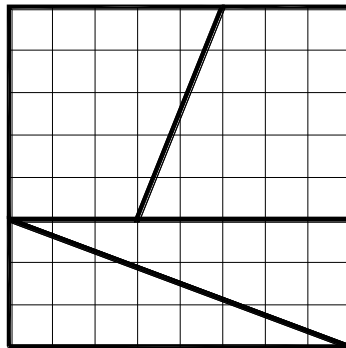
Area of Rectangle = _____

Why are they not equal?

Keeping Tommy out of Trouble.

Pick any two-digit number   (e.g. 47)

Reverse the digits   (i.e. 74)

Now subtract the two numbers, larger − smaller and call it A   (i.e. 74 − 47 = 27 = A)

Now take your original two-digit number and

       subtract the digits, larger – smaller and call it B.   (e.g. 7 − 4 = 3 = B)

Divide this result (B) into the result from the first subtraction (A) and call it C. (i.e A÷B = 27 ÷ 3 = C)

Square this result, add those digits together, square that result, add those digits together…

George's Math

Tony, George and Betty go out to dinner and before the bill comes they each put $10 on the table to pay for the meal, a total of $30. Well, the bill comes and it's only $25. The waiter, Tom, takes the $30 and returns with five $1 bills. George says let's keep the math simple. So, why don't we each take a dollar and then leave the remaining $2 for the waiter as a tip. Later on George begins to feel cheated: They each paid $9 for the meal and gave the waiter a $2 tip which makes $29 so who pocketed the extra $1?