

Problems & Activities from a Lover of the Lifestyle of a Professional Life of Mathematics

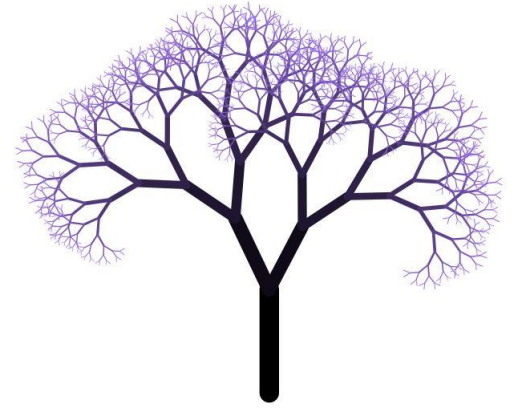
Richard Seitz, ottoseitz@hotmail.com

Friday, April 5th, 2019, 4:30 pm, Hilton Bayfront, Indigo H



Goals

- **Describe several historical curriculum trends**
- **Present some problems to solve**
- **Share a few thoughts about mathematics education**



& a Disclaimer

- *As I get older, I fill the gaps in my memory with imagination...*
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PROBLEMS

1. A group of outrageous teenagers multiplies their ages together and gets 154,791,000. How many teenagers are there in the group?

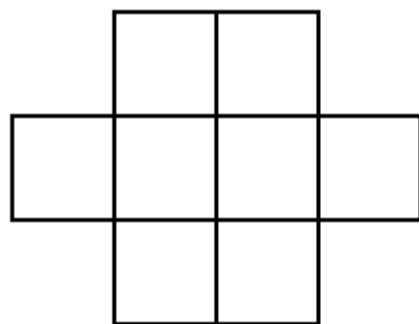


2. A common cow heads off at 4 km / hour along a trail. Two hours later a haughty horse heads off at 6 km/hr from the same spot along the same trail. How much time will it take for the horse to catch up to the cow?

3. How can you make a rope shorter without cutting it?



6. Place the numbers 1 to 8 in the squares so that no consecutive numbers are next to each other.



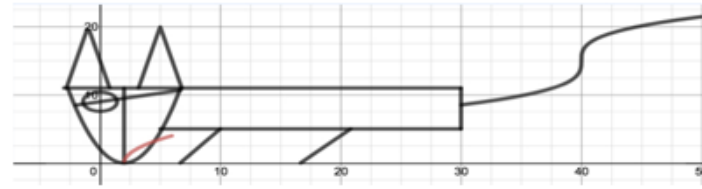
7. Ducklings normally can swim at 1.4 ft/sec and have a burst speed of 6.6 ft per second when running on the water. What is the speed in miles per hour and how does this compare to humans walking and running.



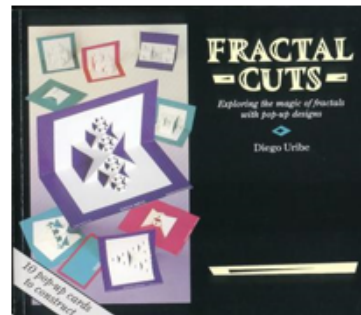
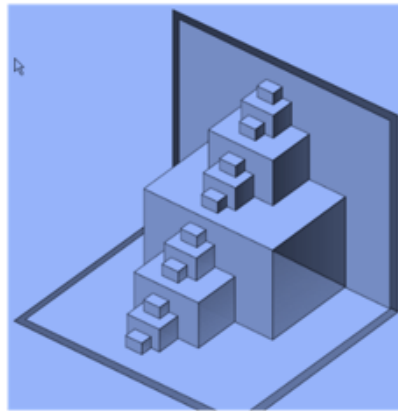
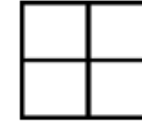
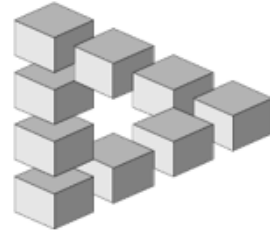
8. Solve this equation $(x^2 - 5x + 5)^{(x^2 - x - 6)} = 1$

Desmos, Terrapin Logo, FMS Logo,

...



GeoGebra, Paint,



FORWARD 40: WHAT BECAME OF THE LOGO PROGRAMMING LANGUAGE?

SHARESHARE
115

TWEET



COMMENT



EMAIL



Forty years ago, researchers developed a [programming language](#) that would become a brilliant educational tool.

As I remember it, LOGO was a triangular turtle that roamed across the monochrome screen of an Apple II in my first grade classroom. Wherever he went, a line of ink would follow him - it came from a pen that was tied to his tail.

My digital friend simultaneously gave me an intuition for geometry and how to think like a computer programmer.

Drawing a Square

REPEAT 4 [FORWARD 100 RIGHT 90]

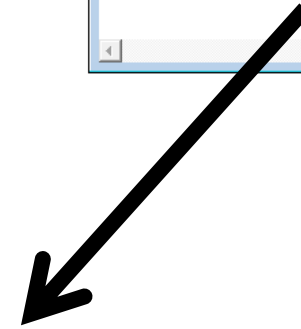
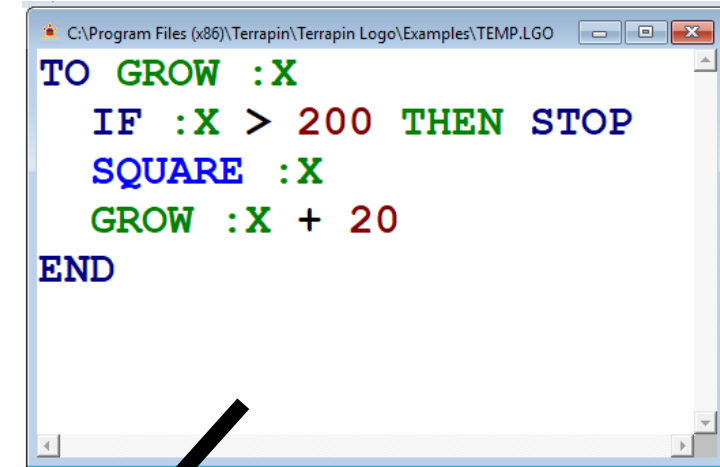
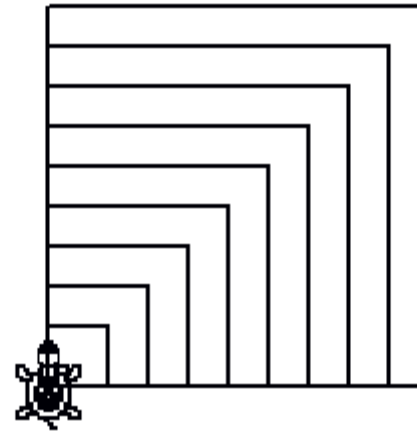
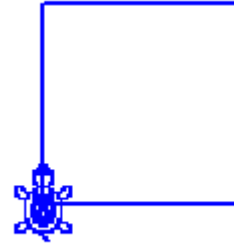
TO SQUARE :X

REPEAT 4 [FD :X RT 90]

END

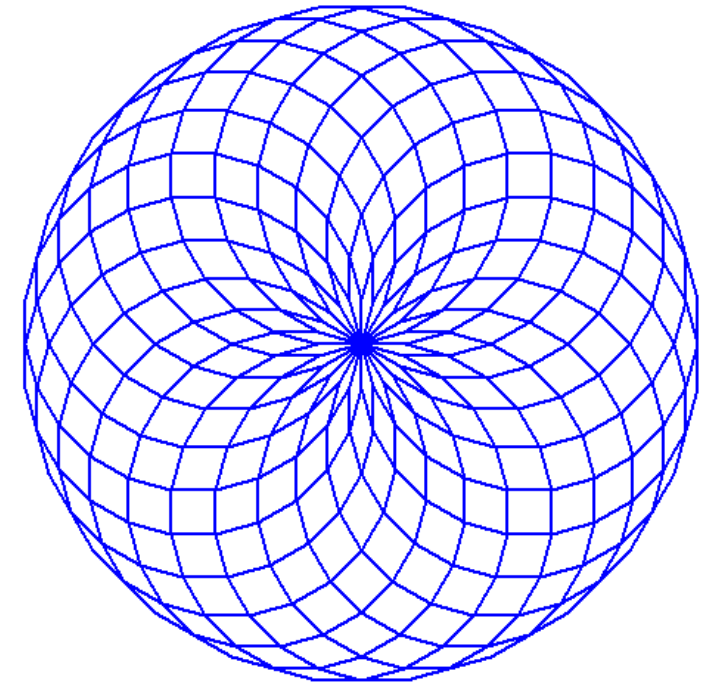
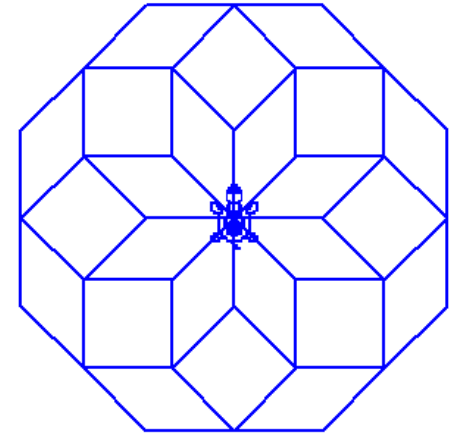
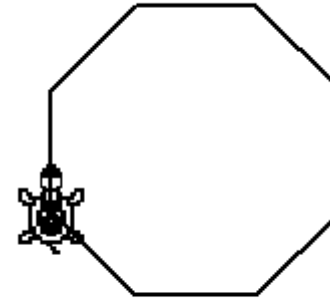
SQUARE 20 SQUARE 40 SQUARE 60

SQUARE 80 ... SQUARE 180



Evolution of Design

- REPEAT 8 [FD 60 RT 45]
- REPEAT 8 [REPEAT 8 [FD 60 RT 45] RT 45]
- REPEAT 24 [REPEAT 24 [FD 40 RT 15] RT 15]





BEST PRACTICE – MONTANA MAPS

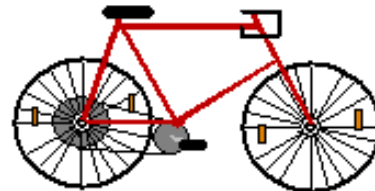
RICHARD T. SEITZ, HELENA HIGH SCHOOL

One of my favorite activities with students is to use a Montana map for generating problems. The problems can be as easy as finding the shortest route between two cities to finding the population center of the state from the census information. Several problems are listed below.

1. Identify the shortest route from Helena to Glendive.
Which two cities are the furthest apart in Montana?
2. Prepare a trip plan for visiting the 25 largest cities in Montana. What method did you use in selecting the route?



3. How far could you have traveled from your hometown in an hour in 1690? In 1890? In 1940? Today? Draw circles to represent the distance you could walk and the distance you could bike and the distance you could drive in an hour. Find the areas represented by the regions.



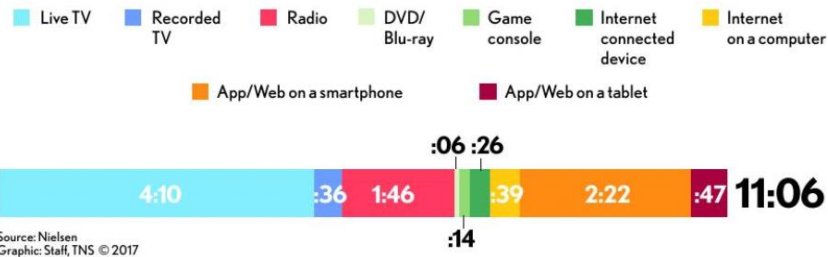
Travel by canoe from Three Forks to Wolf Point, connect the six largest cities with the shortest fiber optic network, ...

All this leads into minimal spanning trees, weighted graphs, finite mathematics, computing, and algorithms!

Data Analysis

U.S. ADULTS SPEND HALF A DAY INTERACTING WITH DIGITAL

American adults spend over 11 hours per day listening to, watching, reading or generally interacting with media.



CLASS SURVEY QUESTIONS

Purpose: To develop a snapshot of aspects of student life. **A final report will be given to classes participating in this survey. Please try to answer every question. Surveys with incomplete or obnoxious responses will be ignored.**

Circle the response or fill in the blank that describes your situation.

- a. **Grade:** 9th 10th 11th 12th b. **Sex:** F M
- a: **Age:** _____ b. **Cash on you right now:** _____
- Are you **dating** right now? Yes No For how long? _____(months)

Circle How seriously on a 1-5 scale?

1 2 3 4 5

Not Serious So – So Very Serious

Fill in the number of hours (round to the nearest hour) spent on each of the following activities.

- _____ hours spent on **homework outside of class time yesterday.**
- _____ hours spent **sleeping last night.**
- _____ hours spent watching **TV yesterday.**
- _____ hours spent on **outdoor or sports activities yesterday.**

Teens online

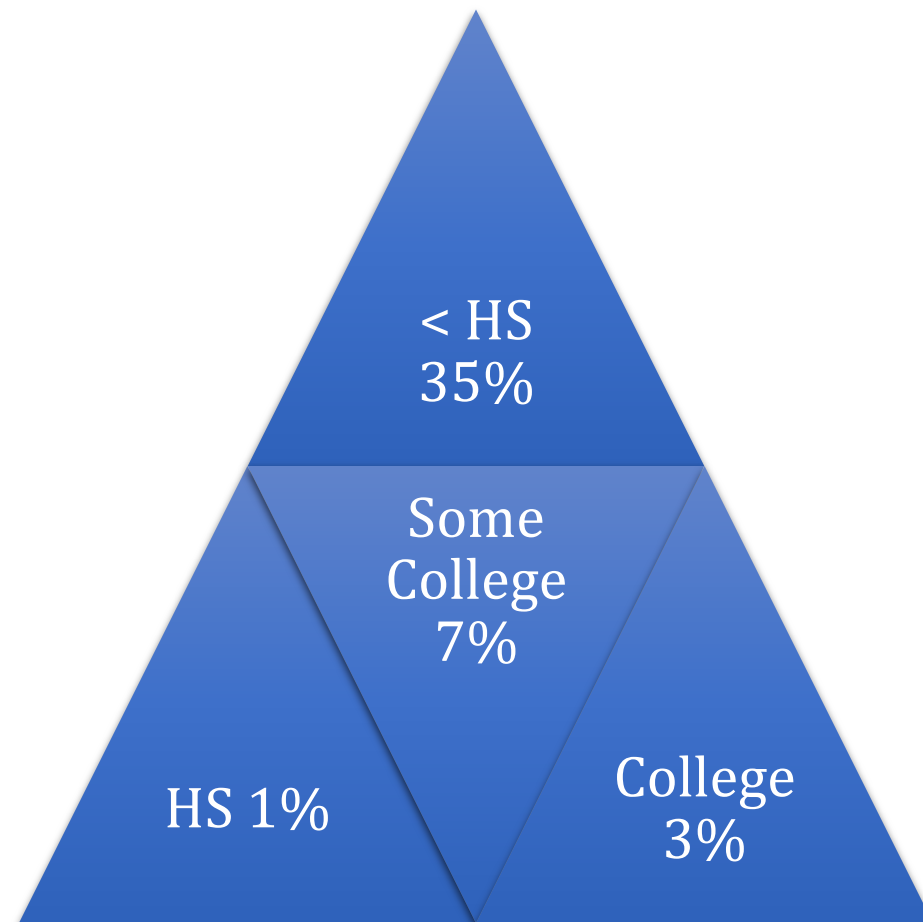
% of U.S. teens who say they use the internet, either on a computer or a cellphone.

- Almost constantly
- Several times a day
- About once a day



Source: Pew Research Center
Graphic: Staff, TNS © 2017

Not Online - by education



RECURSIVE ARITHMETIC WITH %

THOUGHT 5: TECHNOLOGY ALLOWS FOR NEW TYPES OF RECURSIVE THINKING AND FUTURE PLANNING
COLLECT ADVANCED TOPICS

YOU BUY A NEW TRUCK FOR \$35,000. IT LOSES 20% OF ITS VALUE THE DAY YOU DRIVE IT OFF THE LOT AND 7% TO 12% AT THE END OF EVERY YEAR, WHAT IS HAPPENING TO THE VALUE AT MAXIMUM OR MINIMUM DEPRECIATION?



YOU SAVE \$100/MONTH FOR 20 YEARS AT 8% INTEREST/YEAR. HOW MUCH MONEY WOULD YOU HAVE AT THE END OF 20 YEARS? YOU DECIDE YOU HAVE SAVED ENOUGH, HOW MUCH COULD YOU SPEND OVER THE NEXT 20 YEARS?



Mathematics is thought-provoking!

1. Provide weekly problem solving
2. Explore geometric connections
3. Emphasize new topics
4. Use the best and most exciting math technology
5. Keep a file of ideas and pass those ideas on!



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<https://sites.google.com/site/ottoseitzmath/handouts>