Raisins, Ropes, and a Whole Lot More: Six Activities to Open the Door!

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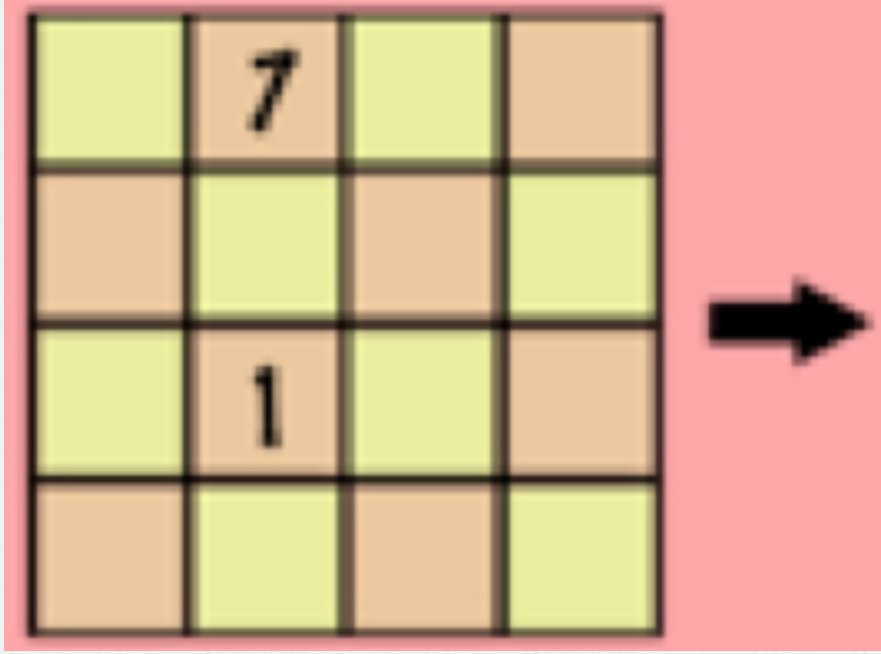
San Antonio

http://math.illinoisstate.edu/day/www.html

Warm-Up Door

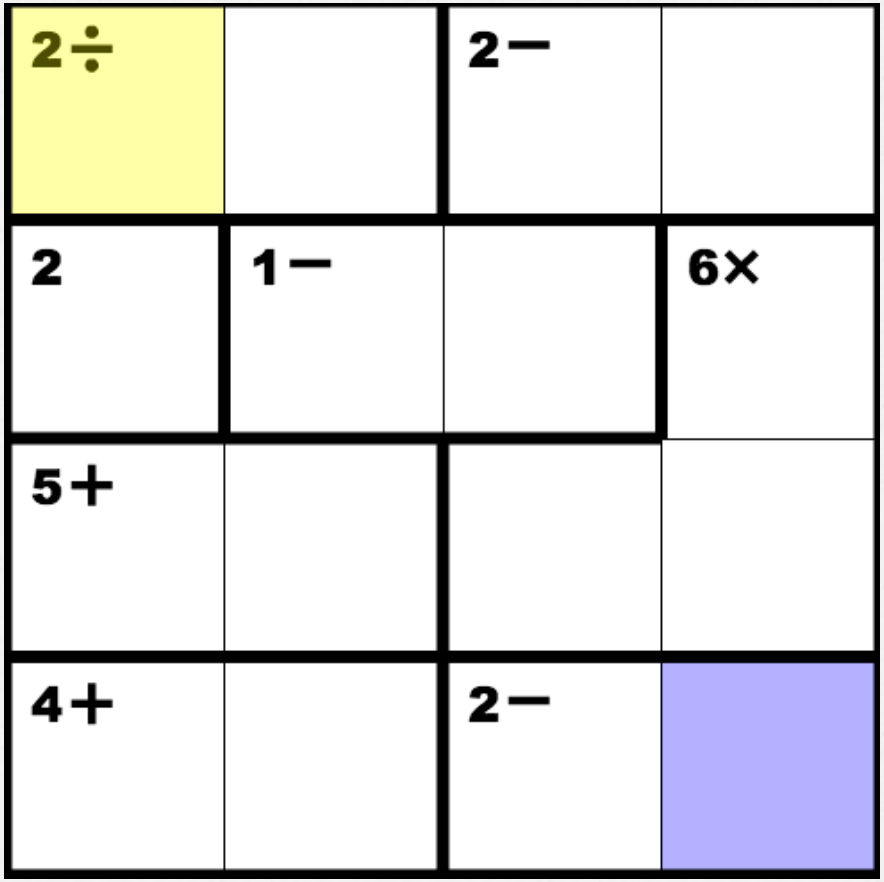
In this 4-by-4 grid, your task is to create a continuous sequence of positive integers, 1 through 16, using the values already in place and making only vertical and horizontal moves.



Warm-Up Door: Where ***Could*** 7 Go?

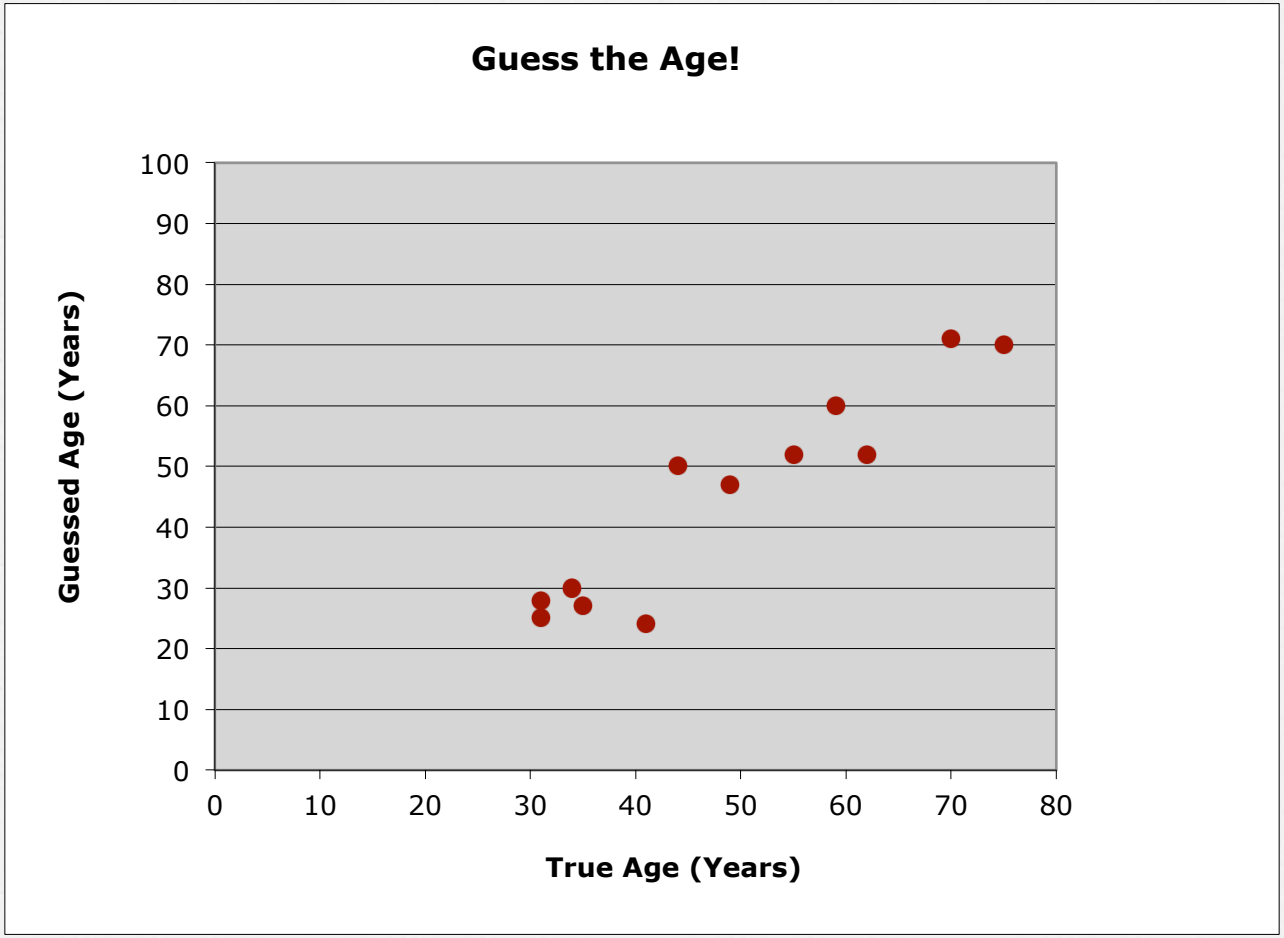
In this 5-by-5 grid, your task is to create a continuous sequence of positive integers, 1 through 25, using the values already in place and making only vertical and horizontal moves.

Warm-Up Door: What's Your **Third** Move?



Door #1: Guess My Age

President Obama	55
Éva Tardos	59
LeBron James	31
Killer Mike	41
Bernie Sanders	75
Sonia Sotomayor	62
Julia Roberts	49
Danica Patrick	35
Octavia Spencer	44
Bruno Mars	31
President Trump	70
Britney Spears	34


Guess the Age!
Guessed Age (Years)
True Age (Years)
100
90
80
70
60
50
40
30
20
10
0
0
10
20
30
40
50
60
70
80


Guess the Age!
Guessed Age (Years)
True Age (Years)
0
10
20
30
40
50
60
70
80
90
100
0
10
20
30
40
50
60
70
80

Door #2: All Knotted Up

1) Grab a rope. Measure and record its length in cm.
2) Tie a knot into the rope.
3) Measure the length of the rope, end to end, to the nearest half cm and record that length in the table below.
4) Repeat this until you have 10 knots in the rope. Make every attempt possible to duplicate the original knot (size, tightness) with every additional knot you create.
5) Collect rope-length data for 0 to 10 knots from another group.
6) Graph your results.

Number of Knots	Length of Your Rope	Length of Other Group's Rope
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

a) Write a sentence or two to describe the relationship between the number of knots and the length of the rope.

b) Generate an equation to represent the relationship between the number of knots and the length of the rope.

c) Use your equation to predict the length of your rope after tying 15 knots.

d) Use your equation to predict the number of knots that would be on your rope if your rope were 24 cm long.

Door #2: All Knotted Up

1. What does the slope of your linear equation represent, in the context of the rope problem?
2. What does the y-intercept represent, in the context of the rope problem?
3. Are there any limitations to using a linear model in the rope context?
4. What other contexts can you think of that might be reasonably modeled by linear relationships?

Door #3: Is That Unusual?

- Suppose the Kick-a-Poo Milling Company made this claim about their Raisin Bran:

  In our 20-ounce box of raisin bran, we average 143 raisins per box.

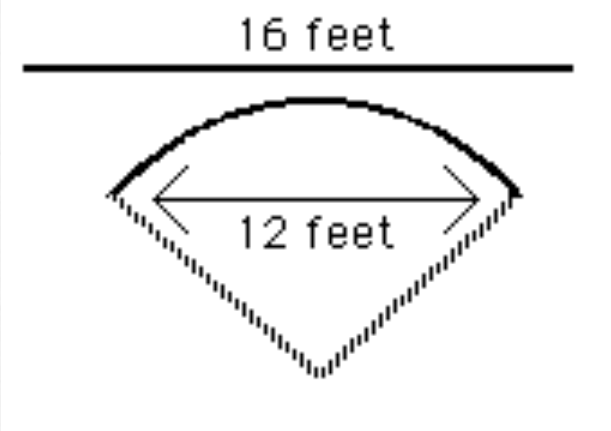
- Now suppose you just opened a 20-ounce box of Kick-a-Poo Raisin Bran and accurately counted 174 raisins. Would this number of raisins be a ***rare occurrence***? Would it seem ***unusual*** to you? Write a sentence to explain your response.

Door #3: Is That Unusual?

Door #4: How Much Cement?

A landscape engineer is adding a concrete patio to a home as part of a landscaping project. Her crew uses thin flexible strips of wood as a border for the wedge-shaped patio. One strip of wood measures 16 feet long and is bent in the arc of a circle so its ends are 12 feet apart. Concrete will fill the wedge created by the arc of the circle and two radii, as shown here. The concrete will be 4" thick.

How long is the radius of this wedge-shaped patio?
How many cubic yards of concrete must be ordered for the patio?



Door #5: Deice a Fuel Line

- While living and working in Norway I drove a 1967 Volkswagen Beetle. As cold temperatures approached, the mechanic at a local garage suggested I use a gasoline additive to absorb any moisture that might condense in the fuel line of the Beetle. I dutifully purchased the product, generically referred to as **deicer**, and poured it in with the gasoline when I next filled the tank.
- The information on the deicer label suggested regular use during cold temperatures and recommended adding a can with every fuel fill. I made a mental note to do that, but at the same time I began to wonder:

What happens in that fuel tank as I add more and more deicer?

Won't the tank eventually be filled with just deicer?

Door #6: A Typical Slice

Bonus Door A: Viewing Tubes

Most of us at one time or another have used a cardboard or plastic tube as a telescope. Although the tube does not actually enlarge what we see, it does help us focus on a narrow field of vision.

In this activity, we are going to try to understand and predict how much of a scene is visible through a viewing tube at a distance. Your group should have a viewing tube and a measuring tape.

Bonus Door A: Viewing Tubes

1. First, try to identify all the variables that you think might effect how much of a vertical wall is visible through a viewing tube. These may be properties of what you're looking at (e.g., how far away is it), or properties of the particular tube that you're using.

2. Next, gather data with your particular tube. Since you are using one particular tube, some of your variables will be fixed. See if you can make a conjecture about how your distance from the wall is related to how much of the wall you can see in your field of vision.

3. After you feel that you understand how your initial viewing tube works, try other sizes of viewing tubes and try to see how this changes the patterns that you find. See what conjectures you can make. We'd like to be able to predict the field of vision for any viewing tube.

4. Once you are confident of your conjectures, see if you can find arguments that would convince a reasonable skeptic that your conjectures are correct.

<u>Write up:</u> Explain what you did, what you found, the conjectures that you made, and whatever evidence you have that they are correct. You should try to write your explanation so that it would convince one of your peers that your conclusions are correct.

Bonus Door B: Where is Your Thumb?

Bonus Door C: Who is the Murderer?

The Weekly

Thursday, February 19, 2009

Police Seek Suspect

Police were summoned at midnight to a grizzly murder scene at the apartment of Eddie the Weasel, a notorious criminal with underworld connections. Upon arrival, the police criminologist recorded the air temperature as a mild 68° F and the body temperature of the dead criminal at 85° F. At 2:00 am, after fingerprints had been taken and suspects questioned, the body had further cooled to 74° F.

Acting on a secure tip, the police arrested Clare Voyant, Eddie's visionary girl friend. Clare had spent the evening in a local restaurant. Angered by being stood up once again, Clare stormed out at 11:15 pm, boldly threatening to kill Eddie. Although it looked like an open-and-shut case, Clare claimed she was innocent

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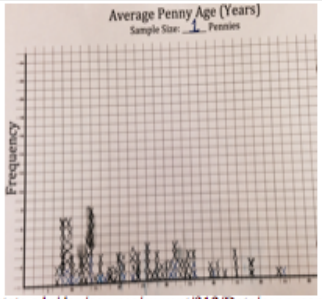
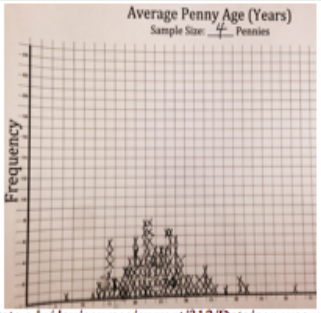
Bonus Door D: A Penny (or more) For Your Thoughts

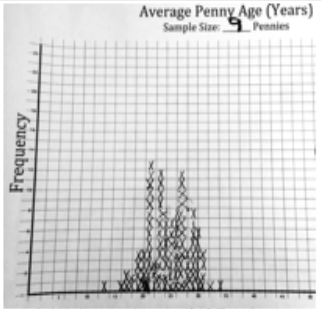
pennies data collection



isstate.edu/day/courses/current/312/Data/pennysamples/penny01a.jpg
sample size: 1 penny



http://math.illinoisstate.edu/day/courses/current/312/Data/pennysamples/pennies04a.jpg
sample size: 4 pennies



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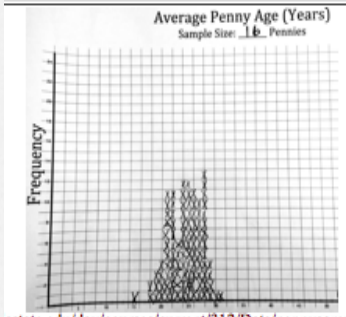
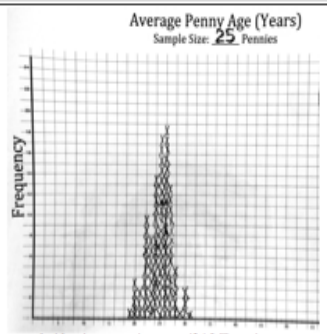
sample size: 9 pennies



sstate.edu/day/courses/current/312/Data/pennysamples/pennies16a.jpg
sample size: 16 pennies



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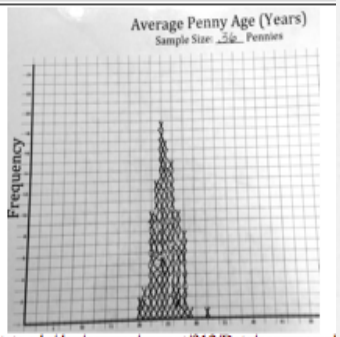
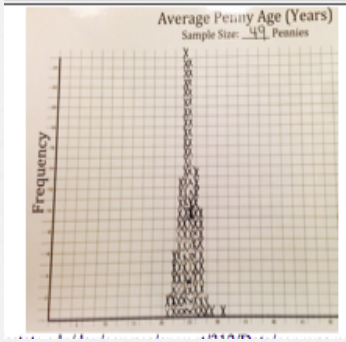
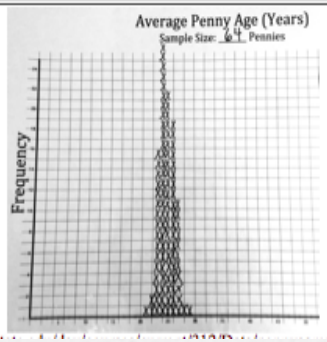
sample size: 25 pennies



http://math.illinoisstate.edu/day/courses/current/312/Data/pennysampl
sample size: 36 pennies





sample size: 81 pennies

Resources: Connecting with Your Mathematics Students

1) http://www.intmath.com/blog/how-to-make-math-class-interesting

2) https://www.edutopia.org/blog/engaging-students-in-math-jose-vilson

Thanks for participating!

Enjoy the rest of the conference!

http://math.illinoisstate.edu/day/www.html