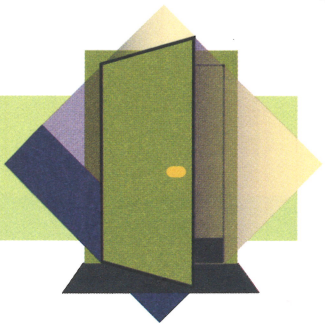
The Doorman



Strands:

Number & Operations	X
Algebra	
Measurement	
Geometry	
Data & Probability	

Materials:

- Paper & pencil
- Calculator (optional)

Where?

Outside	
Inside	X
On-line	
On-site	

Often when people have something they wish to protect or a secret they wish to hide they create a code system. In this activity you'll try to break the code to gain entrance to a secret room!

Imagine that you want to have access to some secret room that is guarded by a doorman. You watch as people approach the doorman hoping to catch on to the password. The 1st person walks up to the doorman. The doorman says "14" and the person responds "28." She is granted access. A 2nd person walks up to the doorman. The doorman says "6.4" and the person responds "12.8." He is granted access. A 3rd person arrives. The doorman says "–5" and the person responds "–10." He is granted access. Have you caught the code?

1. You approach the doorman and he says "6.5". How would you respond?

You cracked the code and made it past the door only to find a 2nd door and yet another doorman. Surely the 2nd doorman will have a harder code to break. Again you watch people as they approach the door. The 1st person approaches the doorman. The doorman says "13" and the person responds "21." He is granted access. A 2nd person approaches the doorman. The doorman says "32" and the person responds "40." She is granted access. A 3rd person approaches the door. The doorman says "–3.7" and the person replies "4.3." She is granted access.

2. You approach the doorman and he says "74". What would you respond?

   a. Make a table of the numbers above, one column for the number the doorman says, and another column for the corresponding number that allowed the person access to the room. Can you find a pattern?

   b. What number will grant you access through this 2nd door?

You can't believe your eyes! You made it through the 2nd door and now there is a 3rd door with a 3rd doorman. This secret room had better be pretty cool! The 1st person approaches the doorman. The doorman says "8" and the person responds with "7". He is granted access. A 2nd person approaches the door. The doorman says "6". The person responds with "6" and is granted access. You wait for another person to approach the doorman. The doorman says "2" to the next person and he responds with "4" and is granted access.

3. If you approach the door and the doorman says "10", with which number would you respond?

   a. Make a table of the numbers above, one column for the number the doorman says, and another column for the corresponding number that allowed the person access to the room.

   b. What number gets you through the door?

   c. From your table what is a general pattern that works? In other words, if the doorman said any number, say n, how would you respond?

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4. Find the patterns that the first two doormen are using for the codes for the doors.

5. Try playing *The Doorman* game with friends. One person assumes the role of the doorman others wish access to the other side of the door. The doorman for each round must choose a consistent pattern so he or she has a way of knowing the right response to any number. Try to guess the pattern. Then switch roles.

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