

The Pigeonhole Principle — Park

Introduction page

Promotional intro sentences

S: The weather is beautiful when you reach the park, so you decide relax, buy grains to feed pigeons and sit on a bench in the sun...

M: The pigeonhole principle is a simple concept that can be used to prove theorems in a very original, clever and powerful way.

General Notes

Duration	Difficulty	Textbook reference
5/5	4/5	(1) Large parts of section 12.3 (2) Small part of section 7.4

Objectives Explain, apply and adapt the concept of the pigeonhole principle. Differentiate between a constructive and a non-constructive proof.

Storyline

On a beautiful afternoon, you reach the city's famous central park. A grain seller to feed the pigeons attracts your attention. You buy a bag of grains from him and sit on a bench, and you start to throw feed to the pigeons. You count 40 pigeons. The bag of grains advertises: "this bag contains at least 1001 grains"... It makes you wonder... and then you see it: *if they eat it all, then at least one pigeon will eat 26 grains (or more).*

Location

Go outside on the stairs going up to the Basketball court.

Checklist

Complete all of the following before moving on. Start with **green**, then **blue (in any order)**, then **red**. More importantly, make sure that you understand the concepts introduced in this location.

When a title starts with an *asterisk*, it means you can find the corresponding page in the material handed out.

<input type="checkbox"/>	<i>*Pre-assessment</i> : Start with this hand-out. Solutions are on Schoology
<input type="checkbox"/>	<i>*Example based notes</i> : Read through the notes. There are always completed examples on the left, while you will have to solve the examples on the right yourself. (Solutions on Schoology).
<input type="checkbox"/>	<i>*Worksheet</i> : Practice your learning with this worksheet.
<input type="checkbox"/>	<i>*Assignments 1 and 2</i> : This hand-out contains two assignments that will bring you to explain and adapt what you learned in personal ways.
<input type="checkbox"/>	<i>*Logo Design Assignment</i> : This assignment of design and composition is repeated in other sections. You will need to expand and harmonize it over time until you reach a final product near the end of the unit, which means now if you've been to the Temple and Palace already!
<input type="checkbox"/>	<i>*Formative quiz</i> : Take this formative quiz when you already feel that you have a firm understanding of the material in this section. Put your notes and everything else away. Once you are done, go to schoology and correct your work.
<input type="checkbox"/>	<i>*The Five Card Trick</i> : Read the chapter on Schoology. It is from the "Number Theory" course at Stanford. Once two students have completed the Park, you will have to pair up, prepare and perform the magic trick in front of me for a small grade.
<input type="checkbox"/>	<i>Show me</i> : Come see me with all your work before moving on to the next building. I will ask you to show me some of your work.
<input type="checkbox"/>	<i>*Formative and Summative assessments</i> : This hand-out includes both a formative assessment that you will have to show me, and information about the summative. Only complete the summative after you have showed me the formative part. Send your video to vrobert@kis.or.kr .
<input type="checkbox"/>	<i>Written exam</i> : Once you've completed the "shopping mall" section as well as this one, you are ready to take the written exam (major assessment). See below for more details.

Written Exam

If you have already visited the shopping mall, then you are ready to take the written exam. This will be a larger summative grade. You will need to find 60 minutes to take that test. The quality of your wording and your writing will count toward the grade. Make sure you review the content from the sections listed here before asking me to take that test:

- Tourist Office
- Bus Stop
- Internet Café
- Plaza
- Bookshop
- Palace
- Shopping Mall
- Park

Conclusion

You reached the end of your bag of grains. The 40 pigeons have eaten every single last one of them. Suddenly a little girl comes running and scares the pigeons away. They all fly toward a tree. That tree has 13 branches. Once again it makes you wonder... Then with a smile, you walk back to the entrance of the park. What a great day! You feel re-energized. And it is time to think about your next destination. Where shall you go?