Examples of Tasks from ©2008 Course 1, Unit 8

Getting Started

The tasks below are selected with the intent of presenting key ideas and skills. **Not every answer is complete**, so that teachers can still assign these questions and expect students to finish the tasks. If you are working with your student on homework, please use these solutions with the intention of increasing student understanding and independence. A list of questions to use as you work together, prepared in English and Spanish, is available. Encourage students to refer to their class notes and Math Toolkit entries for assistance.

As you read these selected homework tasks and solutions, you will notice that some very sophisticated communication skills are expected. Students develop these over time. This is the standard for which to strive. See Research on Communication.

The Statistics page or the Scope and Sequence (2nd edition) might help you follow the conceptual development of the ideas you see in these examples.

Main Mathematical Goals for Unit 8

Upon completion of this unit, students should be able to:

- construct sample spaces and probability distributions and use them to understand chance situations involving equally likely outcomes.
- use the Addition Rule and its special case for mutually exclusive events to compute $P(A \text{ and } B)$.
- design and carry out simulations in order to estimate answers to questions about probability using random number generators.
- use the Law of Large Numbers to understand situations involving chance.
- use geometric diagrams to solve probability problems that involve continuous variables.

What Solutions are Available?

Lesson 1: Investigation 1—Applications Task 3 (p. 542), Connections Task 8 (p. 545)
Investigation 2—Extensions Task 21 (p. 548)

Lesson 2: Investigation 1—Applications Task 2 (p. 572), Connections Task 9 (p. 577)
Investigation 2—Applications Task 5 (p. 575)
Investigation 3—Connections Task 13 (p. 578), Extensions Task 21 (p. 581)
Investigation 4—Applications Task 7 (p. 577)

Selected Homework Tasks and Expected Solutions

(These solutions are for tasks in the 2nd edition book—2008 copyright.
For homework tasks in books with earlier copyright dates, see Helping with Homework.)

Lesson 1, Investigation 1, Applications Task 3 (p. 542)

a. A partial table is filled in at the right.

b–d. To be completed by the student.

e. $\frac{3}{24}$

Tetrahedral Die \ Six-Sided Die	1	2	3	4	5	6
1	1, 1	1, 2	1, 3	1, 4	1, 5	1, 6
2						
3						
4						

Lesson 1, Investigation 1, Connections Task 8 (p. 545)

a. $y = \frac{1}{36}x - \frac{1}{36}$

b. To be completed by the student.

c. To be completed by the student.

Lesson 1, Investigation 2, Extensions Task 21 (p. 548)

The problem does not ask for students to make a probability distribution for this task. However, to be successful, they really need one. So, encourage your student to do so. One is started in the table at the right.

a. $\frac{14}{36}$. You could roll (1, 2), (2, 1), (1, 1), (x, 3), or (3, x), where x could be any number. The latter two together account for only 11 possible rolls of the dice as roll (3, 3) occurs in both (x, 3) and (3, x).

b. To be completed by the student.

c. To be completed by the student.

Spaces Ahead	Probability Will Hit	Spaces Ahead	Probability Will Hit
1	$\frac{11}{36}$	13	0
2	$\frac{12}{36}$	14	0
3	$\frac{14}{36}$	15	$\frac{1}{36}$
4		16	
5		17	
6		18	
7		19	
8		20	
9		21	
10		22	
11		23	
12		24	

Lesson 2, Investigation 1, Applications Task 2 (p. 572)

a. For each question Jeffery answers, flip a coin. If the coin is a head, he guessed the right answer. If the coin is a tail, he guessed the wrong answer. Flip the coin 10 times and count the number of heads, which represents the number of answers Jeffrey got right.

b. The results will vary depending on the outcomes. Add the data to the set of 495 and proceed.

c. *Hint:* Remember that the estimate of the mean on a histogram is the balance point and the estimate of the standard deviation is approximately the middle $\frac{2}{3}$.

To be completed by the student.

d. To be completed by the student.

e. *Hint:* A score of 70% or better would be the same as 7 or more correct. Use the results from the frequency table to find the probability.

To be completed by the student.

f. To be completed by the student.

Lesson 2, Investigation 1, Connections Task 9 (p. 577)

a. Yes. Since the die has three sides marked H and three sides marked T, the probability of H is $\frac{1}{2}$, and the probability of T is $\frac{1}{2}$.

b. For example, let the numbers 1, 2, and 3 represent the birth of a girl and the numbers 4, 5, and 6 represent the birth of a boy.

c. To be completed by the student.

d. To be completed by the student.

Lesson 2, Investigation 2, Applications Task 5 (p. 575)

a. Group the digits by pairs. Let 01 through 62 represent a graduate who immediately enrolls in college. The pairs 63 through 99 and 00 represent a graduate who doesn't immediately enroll in college. The calculator random number generator command is **randInt(1,100)**.

b. To be completed by the student.

c. Results will vary.

d. **i.** Your answer will depend upon the results from Part c.

ii. To be completed by the student.

e. To be completed by the student.

Lesson 2, Investigation 3, Connections Task 13 (p. 578)

Hint: Remember that you are looking at the first quadrant of a coordinate grid. The points on the grid are all ordered pairs (x, y). You are looking for the area under the curve where the y-coordinate is less than the x-coordinate squared.

Pick two random numbers between 0 and 1 by using the **rand** command twice. These two numbers are your ordered pair (x, y) = (*first number*, *second number*) that lies in the square. If it is the case that the (*second number*) < (*first number*)^2, then the point lies below the graph of $y = x^2$. Record this as a success. Repeat many times. The proportion of successes out of the total number of runs gives an estimate of the probability a randomly selected point is below $y = x^2$. This is also an estimate of the area below the curve. (The theoretical answer, found using calculus, is $\frac{1}{3}$.)

Lesson 2, Investigation 3, Extensions Task 21 (p. 581)

a, c, d. To be completed by the student.

b. The probabilities change because Toni changes the conditions by removing a key on each draw. So, if she has to draw a second time, there are only 3 keys to chose from and her chance of getting the car key is now 1 in 3. As she proceeds, the chance that she draws the car key increases.

Lesson 2, Investigation 4, Applications Task 7 (p. 577)

a. To be completed by the student.

b. This time you have the condition that $x + y < 1$. The diagonal line represents possible (x, y) pairs where $x + y = 1$, or $y = 1 - x$. The area under the diagonal line represents the probability that the sum of the two numbers is less than 1. Computing the area of the triangle is left for the student to complete.