Probability. Other Homework problems

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A colonel teaches air defence at Moscow State University, Math Department. He says "If we try to hit a B-52 with this missile, the probability of success is 5%."

A math student asks: "What if we try to miss?"

The colonel thinks for a while and answers: "Then the probability of a hit is 95%."

Finish the problems from the class handout.

Competition practice

Exercise 1. AMC. Diana and Apollo roll a standard die obtaining a number at random from 1 to 6. What is the probability that Diana's number is larger than Apollo's number?

Exercise 2. AMC. A point is chosen at random from within a circular region. What is the probability that the point is closer to the center of the region than it is to the boundary of the region?

Exercise 3. AMC. A pair of 8-sided dice have sides numbered 1 through 8. Each side has the same probability of landing face up. What is the probability that the product of the two numbers on the sides that land face up exceeds 36?

Exercise 4. AMC. Tamika selects two different numbers at random from the set 8, 9, 10 and adds them. Carlos takes two different numbers at random from the set 3, 5, 6 and multiplies them. What is the probability that Tamika's result is greater than Carlos' result?

Challenge Problems

Exercise 5. In how many ways can you run up a staircase with n steps, taking steps of odd sizes where the order is relevant and there is no other restriction on the number or the size of each step taken?

Exercise 6. Of monkeys and children. Apinayé belongs to the Ge language family of Brazil. Currently it is spoken by less than 800 people, and therefore is seriously endangered. The following are some sentences in Apinayé, along with their English translations. You will see some letters here that do not occur in the English or Portuguese writing systems. You do not need to know exactly how these letters are pronounced in order to solve this problem:

1. Kukrẽ kokoi. — "The monkey eats."
2. Ape kra. — "The child works."
3. Ape kokoi ratš. — "The big monkey works."
4. Ape mï mɛtš. — "The good man works."
5. Ape mɛtš kra. — "The child works well."
6. Ape punui mï piŋetš. — "The old man works badly."

A1 (practical). Translate the following into English:

1. Ape ratš mï mɛtš.
2. Kukrẽ ratš kokoi punui.
3. Ape piŋetš mï.

A2 (practical). Translate the following into Apinayé:

1. "The big child works a long time."
2. "The old monkey eats a lot."

A3 (theoretical). Explain the meanings of the following words: ratš: mɛtš: piŋetš: