Test due Aug 11, 2021 17:00 CEST

Brinell & Rockwell

2/2 points (graded)

Brinell & Rockwell (B&R) is a high-end manufacturer of cutting and drilling bits for lathe machines, drill presses, and other metal-working equipment. They pride themselves in producing only bits of the very best quality, guaranteed to last longer than the bits from any of their competitors. Brinell & Rockwell has a hotline where customers can call to report when a B&R bit fails before it is expected. At that time, Brinell & Rockwell will ship a replacement bit to the customer free of charge, and the customer will return the failed bit for examination. Back at the Quality Control Department of Brinell & Rockwell, a team of scientists and engineers - including several with PhDs in Metallurgy - will examine the failed bits under the microscope, X-Ray machines, and other diagnostics equipment to determine exactly what went wrong.

Brinell & Rockwell's quality control team keeps the failed bits that they have collected from customers in large glass containers, using one glass container per bit model. They have gathered thousands of failed drilling and cutting bits of 73 different models, including 62 models of drilling bits. These 62 models of drilling bits can be grouped into four families:

Diamond Bits	Tungsten Bits	Iridium Bits	Adamantium Bits
14	19	20	9

In summary, they have collected failed bits of 73 different models, and they use one glass container for every bit model. Therefore, Brinell & Rockwell has in the lab a total of 73 different glass containers. Taking into account that drilling bits can be grouped into families, we know that 14 glass containers contain Diamond bits, 19 glass containers contain Tungsten bits, 20 glass containers contain Iridium bits, and 9 glass containers contain Adamantium bits.

Part 1

Howard Clark is the first worker to arrive to the lab. Following the standard policy of Brinell & Rockwell, he will pick up the first bit to be inspected from a randomly selected glass container. This means he is equally likely to pick up a bit from any one of the 73 containers.

What is the probability that Howard will pick up an Iridium bit?

Enter your answer as a fraction or in decimal form using three decimal places. For example, if your answer is 23.24%, you should enter .232 in the box below or the respective fraction.

0.274

0.274

Submit You have used 1 of 15 attempts

Correct (2/2 points)

Par

t 2

2/2 points (graded)

Jennifer Phillips is the second worker to arrive to the lab. Following Brinell & Rockwell policy, she will pick two bits from randomly and independently selected containers. She is equally likely to select any of the containers. Even the container selected to pick up the first bit has the same chance of being chosen as any other container at the time she picks the second bit (meaning that Jennifer could grab the same model of bit twice).

What is the probability that Jennifer will pick up at least one Iridium bit?

Enter your answer as an expression with fractions or in decimal form using three decimal places. For example, if your answer is 23.24%, you should enter .232 in the box below or the respective expression.

0.473

0.473

Submit You have used 2 of 15 attempts

Correct (2/2 points)

Par

t 3

2/2 points (graded)

A new piece of equipment, a positronic resonance imager (PRI), has been acquired by Brinell & Rockwell. Their chief scientist, Rebecca, wants to try it on two randomly selected bit models, different from each other. This means once a bit model is picked up to serve as the first bit, the same model cannot be picked up again.

What is the probability that both bits picked up are Tungsten bits? In other words, what is the probability of drawing two Tungsten bit consecutively, if the container from the first drawing was removed before the second drawing?

Enter your answer as an expression with fractions or in decimal form using three decimal places. For example, if your answer is 23.24%, you should enter .232 in the box below or the respective expression.

0.065

0.065

Submit You have used 1 of 15 attempts

Correct (2/2 points)