# 2.12 School Absences

Data collected at elementary schools in DeKalb County, GA suggest that each year roughly 25% of students miss exactly one day of school, 15% miss 2 days, and 28% miss 3 or more days due to sickness.

**a)** What is the probability that a student chosen at random doesn't miss any days of school due to sickness this year?

1 – ((0.25) + (0.15) + (0.28)) = 0.32 OR 32%

|  |  |  |
| --- | --- | --- |
| Never Missed a Day | 32% | 0.32 |
| Missed 1 Day | 25% | 0.25 |
| Missed 2 Days | 15% | 0.15 |
| Missed 3 Days or More | 28% | 0.28 |

**(b)** What is the probability that a student chosen at random misses no more than one day?

1 – ((0.15) + (0.28)) = 0.57 OR 57%

**(c)** What is the probability that a student chosen at random misses at least one day?

0.25 + 0.15 + 0.28 = 0.68 OR 68%

**(d)** If a parent has two kids at a DeKalb County elementary school, what is the probability that neither kid will miss any school? Note any assumption you must make to answer this question.

Apply: P(A and B) = P(A) x P(B) – Multiplication Rule (Never Missed a Day| 32%)(assuming both are independent)

P(KidA and KidB) = P(KidA) x P(KidB)

0.32 x 0.32 = 0.1024

**(e)** If a parent has two kids at a DeKalb County elementary school, what is the probability that both kids will miss some school, i.e. at least one day? Note any assumption you make.

Apply: P(A and B) = P(A) x P(B) – Multiplication Rule (Never Missed a Day| 32%)(assuming both are independent)

P(KidA and KidB) = P(KidA) x P(KidB)

0.68 x 0.68= 0.4624

**(f)** If you made an assumption in part (d) or (e), do you think it was reasonable? If you didn’t make any assumptions, double check your earlier answers.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ­­­­­ | Neither Overweight nor obese | Overweight | Obese | Total |
| Health Coverage (yes) | 134,801 | 141,699 | 107,301 | 383,801 |
| Health Coverage (no) | 15,098 | 15,327 | 14,412 | 44,837 |
| Total | 149,899 | 157,026 | 121,713 | 428,638 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Neither Overweight nor obese | Overweight | Obese | Total |
| Health Coverage (yes) | 0.314 | 0.331 | 0.250 | 0.895 |
| Health Coverage (no) | 0.035 | 0.036 | 0.034 | 0.105 |
| Total | 0.350 | 0.366 | 0.284 | 1.000 |

# 2.14 Weight and health coverage, Part 1

**(a)** If we draw one individual at random, what is the probability that the respondent is overweight and doesn't have health coverage?

=P(Overweight) + P(Health Coverage) - P(Overweight | Health Coverage)

=(0.366 + 0.895-0.331)

=93.1%

**(b)** If we draw one individual at random, what is the probability that the respondent is overweight or doesn't have health coverage?

=P(Obese | No Health Coverage) =

0.034 / 0.105 = 0.323

=32%

# 2.28 Socks in a drawer.

In your sock drawer you have 4 blue, 5 gray and 3 black socks.Half asleep one morning you grab 2 socks at random and put them on. Find the Probability you end up wearing.

1. 2 blue socks

number of ways to draw two blue socks:

C(n,r) =   
C(4,2) =  
4! / (2! (4 - 2)!) = 6

number of ways to draw two socks of any color:

C(n,r) =   
C(12,2) =  
12! / (2! (12 - 2)!) = 66

Probability (draw two blue socks) = 6/66 = 1/11

1. ­­­No gray socks
2. At least 1 black sock
3. A green sock
4. Matching socks.

# 2.30 Books on a bookshelf.

The table below shows the distribution of books on a bookcase based on whether they are non fiction or fiction and hardcover or paperback. Format Hardcover Paperback

|  |  |  |  |
| --- | --- | --- | --- |
|  | Hardcover | Paperback | Total |
| Fiction | 12 | 59 | 72 |
| Non Fiction | 15 | 8 | 23 |
| Total | 28 | 67 | 95 |

(a) Find the probability of drawing a hardcover book first then a paperback fiction book second when drawing without replacement.  
(b) Determine the probability of drawing a fiction book first and then a hardcover book second, when drawing without replacement.  
(c) Calculate the probability of the scenario in part (b), except this time complete the calculations under the scenario where the first book is placed back on the bookcase before randomly drawing the second book.  
(d) The final answers to parts (b) and (c) are very similar. Explain why this is the case.