Ch 3.5 Multiplication Rule with Complements and Conditional Probability

Ex1) For At least 1: 1 - P(0)

Ex1a) P(having at least 1 girl w/3 kids) =

Child 1	Child 2	Child 3
Boy	Girl	Boy
Boy	Boy	Boy
Boy	Boy	Girl
Boy	Girl	Girl
Girl	Boy	Girl
Girl	Girl	Girl
Girl	Girl	Boy
Girl	Boy	Boy

or

1 - P(no girls)

$1 - (\frac{1}{2})^3$

1 - 1/8 = 7/8

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Ex1b) 4 multiple choice questions what is the P(at least 1 is correct)

1 - P(all wrong)

$1 - (\frac{3}{4})^4 = 0.68$

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Ex1c) P(defect) = 30%, if you pick 5 items what is the P(at least 1 is defective)

1 - P(5 good)

$1 - (.70)^5 = 0.83193$

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Try #1. 20 T/F questions, what is the P (you get at least 1 correct)?

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Ex2) Conditional Probability:
Probability of B occurring given A

$$P(B|A) = \frac{P(A \text{ and } B)}{P(A)}$$

Ex2a) P. 146 Titantic Data

Find the P(a person survived given they were a man)

$$P(\text{survived}|\text{man}) = \frac{P(\text{man and survived})}{P(\text{man})}$$

$$\frac{\frac{332}{2223}}{\frac{706}{2223}}$$

0.196

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Ex1b) $P(\text{man}|\text{survived}) = \frac{P(\text{survived and man})}{P(\text{survived})}$

$$\frac{\frac{332}{2223}}{\frac{706}{2223}}$$

0.470

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Ex1c) P(survived|women or child)

$$\frac{\text{P(women or kid and survived)}}{\text{P(women or child)}}$$

$$\frac{\frac{374}{2223}}{\frac{531}{2223}}$$

0.704

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Try

	cola	root beer	lemon-lime
under 21	40	25	20
21-40	35	20	30
40+	20	30	35

P(a person drinks root beer given they are over 40)

P(under 21given they drink cola)

Mar 30-2:56 PM