

~~Section 1.4: Basic Probability and Section 1.5: Rules for Probability~~ 7.2 + 7.3

Example: Use the probability distribution and the events to answer these questions.

S	a	b	c	d	e	f
prob	0.15	0.08	0.21	0.12	0.25	.19

$$E = \{a, c, d, e\}$$

$$F = \{b, d, f\}$$

$$G = \{a, b, d\}$$

A) $P(S) = 1$

$P(\phi) = 0$

$P(\{f\}) = P(f) = .19$

B) $P(E) = .15 + .21 + .12 + .25$

C) $P(E^c) = .08 + .19$

$$P(E) + P(E^c) = 1$$

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S	^G a	^G b	^G c	^F d	^F e	^F f
prob	0.15	0.08	0.21	0.12	0.25	.19

$$F \cap G = \{b, d\}$$

$$E = \{a, c, d, e\}$$

$$F = \{b, d, f\}$$

$$G = \{a, b, d\}$$

D) $P(F \cap G) = .08 + .12$

E) $P(E \cup G) = .81$

$$P(E \cup G) = P(E) + P(G) - P(E \cap G)$$

$$= (.15 + .21 + .12 + .25) + (.15 + .08 + .12) - (.15 + .12)$$

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5. (8 points) An experiment with sample space $S = \{ a, b, c, d, e \}$ has the probability distribution given below.

You know that $A = \{ b, c, e \}$, that $B = \{ a, b \}$, that outcomes c and d are equally likely, and that $P(A^c) = 0.41$.

S	a	b	c	d	e
probability	0.11	0.14	p_3	p_4	p_5

(a) Find p_5

$$.11 + .14 + p_3 + p_4 + p_5 = 1$$

$$.11 + .14 + .3 + .3 + p_5 = 1$$

$$.85 + p_5 = 1$$

$$p_5 = .15$$

$$p_3 = p_4$$

$$A^c = \{ a, d \}$$

$$.11 + p_4 = .41$$

$$p_4 = .3$$

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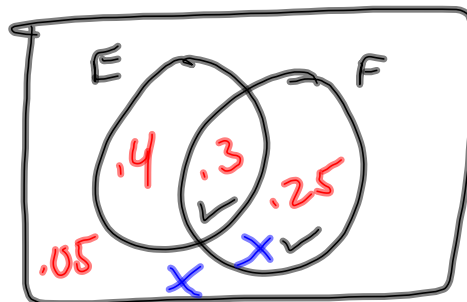
E and F are events of an experiment with sample space S . Suppose $P(E) = 0.7$, $P(F^c) = 0.45$, and $P(E \cap F^c) = 0.4$. Compute

(a) $P(F) = .3 + .25 = .55$

(b) $P(F \cap E) = .3$

(c) $P(E^c \cup F) =$

$$.3 + .25 + .05$$



$$P(E^c) + P(F) - P(E^c \cap F)$$

$$.3 + .55 - .25 =$$

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Example: This table classifies the English, History, Math, and Poly Sci majors at State U according to their year. (There are no double majors.)

	Freshmen(F)	Sophomores(Soph)	Juniors(J)	Seniors(Sr)	Totals
English(E)	64	35	31	41	171
History(H)	55	41	33	52	181
Math(M)	29	32	50	69	180
Poly Sci(PS)	70	33	41	37	181
Totals	218	141	155	199	713

If a student is selected at random, find the probability that

A) The student is a History major and a Sophomore.

$$\frac{41}{713}$$

B) The student is not a Sophomore and is an English major.

$$\frac{64 + 31 + 41}{713} = \frac{171 - 35}{713}$$

C) The student is a Math major or is a Senior.

$$\frac{29 + 32 + 50 + 41 + 52 + 69 + 37}{713} = \frac{180 + 199 - 69}{713}$$

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Example: Roll a 4 side die and a 6 sided die. Find the probability of

A) getting a sum greater than 9.

$$\frac{1}{24}$$

B) getting a sum of 6 and at least one die comes up a 2.

$$\frac{2}{24}$$

C) getting a sum of 6 or at least one die comes up a 2.

$$\frac{11}{24}$$

	1	2	3	4
1		X		
2	X	X	X	X
3		X	✓	
4		X	✓	8
5	✓	X	8	9
6		8	9	10

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300 items
5 beds } → 295 goods

pick sample of 4

How many ways at most 1 bed.
↳ 0 or 1 bed.

$$C(5, 0) \cdot C(295, 4) + C(5, 1) \cdot C(295, 3)$$

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$$5 \cdot \left(\frac{2 \cdot 1 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{\dots} \right)$$

$$6! - 5(2 \cdot 1 \cdot 4 \cdot 3 \cdot 2 \cdot 1)$$

$$\frac{2 \cdot 4 \cdot 3 \cdot 2 \cdot 1 \cdot 1}{5!}$$

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