

## Basic Probability

- 1) Find the sample space for each of the following experiments:
  - a) the grade received in a course
  - b) tossing a coin and then rolling a die.
  - c) answering 3 true/false questions.
  - d) choosing a day of the week.
  - e) choosing a month.
  - f) rolling a 4-sided die twice.
- 2) Which of the following probability assignments are valid? Explain.
  - a)  $S = \{a, b, c, d\}$ ,  $P(a) = .3$ ,  $P(b) = .2$ ,  $P(c) = .1$ ,  $P(d) = .4$
  - b)  $S = \{a, b, c\}$ ,  $P(a) = .4$ ,  $P(b) = 0$ ,  $P(c) = .6$
  - c)  $S = \{\text{Tom, Joe, Bill}\}$ ,  $P(\text{Tom}) = .35$ ,  $P(\text{Joe}) = .4$ ,  $P(\text{Bill}) = .2$
  - d)  $S = \{2, 4, 6, 8, 10\}$ ,  $P(2) = .2$ ,  $P(4) = .3$ ,  $P(6) = .25$ ,  $P(8) = .25$ ,  $P(10) = .15$
  - e)  $S = \{v, w, x, y, z\}$ ,  $P(v) = P(w) = P(x) = P(y) = P(z) = 1/5$
  - f)  $S = \{\text{Ohio, Iowa, Utah, Maine}\}$ ,  $P(\text{Ohio}) = .3$ ,  $P(\text{Iowa}) = -.4$ ,  $P(\text{Utah}) = .5$ ,  $P(\text{Maine}) = .6$
  - g)  $S = \{\text{yes, no, maybe}\}$ ,  $P(\text{yes}) = .8$ ,  $P(\text{no}) = .1$ ,  $P(\text{maybe}) = 1.1$
- 3) If  $S = \{1, 2, 3, 4\}$  and  $P(1) = .12$ ,  $P(2) = .26$ , and  $P(3) = .34$ 
  - a) find  $P(4)$  .
  - b) If a number is drawn at random from  $S$  find the probability that it is
    - i) even
    - ii) less than 4
    - iii) at least 2
- 4) If  $S = \{\text{Ford, Saab, Audi, VW, BMW}\}$  and  $P(\text{Ford}) = .05$ ,  $P(\text{Saab}) = .18$ ,  $P(\text{Audi}) = .3$ , and  $P(\text{BMW}) = .1$ 
  - a) Find  $P(\text{VW})$  .
  - b) If a car is chosen at random find the probability that it is
    - i) a VW or BMW.
    - ii) not a Ford.
    - iii) a car whose first letter is between A and G, inclusive.
- 5) If  $S = \{w, x, y, z\}$ ,  $P(x) = .25$ ,  $P(y) = .15$ ,  $P(w, y) = .65$ ,  $P(x, z) = .35$ , find
  - a)  $P(w)$  and  $P(z)$  .
  - b)  $P(x, w)$  .
  - c)  $P(x, y, z)$  .
- 6) A sales table is piled with sweaters, some of which are wool, some cotton, and some acrylic. The sizes are small, medium, and large. The probability of each kind of sweater is given in the following table.

	small	medium	large
wool	0.05	0.1	0.06
cotton	0.12	0.15	0.09
acrylic	0.11	0.18	0.14

A sweater is chosen at random. Find the probability that it is

- a) wool.
- b) large.
- c) wool or cotton.
- d) acrylic or small.

7) Miss Acme, Mr. Butler, and Mrs. Clay assign projects in their math classes. Some students use calculators and others do not. The results are shown.

	Acme	Butler	Clay
Calculator	13	11	17
No Calculator	15	16	9

If a student is picked at random find the probability that he/she

- a) uses a calculator.
- b) is in Miss Acme's class and does not use a calculator.
- c) is in Mr. Butler's class or uses a calculator.
- d) has a female teacher.