

### **Day 3 Homework Answers:**

1. C

5.  $45/100$

2. C

6. .35, .85

3.  $3/25$

7.  $4/10$

4. .72, .98

Day 3 Homework

1. The probability of an event happening is 0.6. What is the probability of the event not happening?

a. 0  
b. 0.10

c. 0.4  
d. 0.6

$$\begin{aligned} P(\text{Not } E) &= 1 - P(E) \\ &= 1 - .6 \\ &= .4 \end{aligned}$$

2. Two events, A and B, are mutually exclusive or disjoint. What is  $P(A \text{ and } B)$ ?

a.  $P(A) \cdot P(B)$   
b.  $P(A) + P(B)$

c. 0  
d. 1

No Both

3. A golfer will play two holes of a course. Suppose that on each hole the player will score 3, 4, 5, 6, or 7, with these five scores being equally likely. Justify your answer and find the probability that the player's total score for the two holes will be:

a. 14 =  $P(7 \text{ and } 7) = \frac{1}{5} \times \frac{1}{5} = \frac{1}{25}$

b. 12 =  $P(6 \text{ and } 6 \text{ or } 7 \text{ and } 5 \text{ or } 5 \text{ and } 7)$   
 $= \frac{1}{5} \times \frac{1}{5} + \frac{1}{5} \times \frac{1}{5} + \frac{1}{5} \times \frac{1}{5} = \frac{3}{25}$

4. Josie will soon be taking exams in math and Spanish. She estimates that the probability she will pass the math exam is 0.9 and the probability that she will pass the Spanish exam is 0.8. She is also willing to assume that the results of the two exams are independent of each other.

- a. Using Josie's assumption of independence, calculate the probability that she will pass both exams.

$$P(M \text{ and } S) = .9 \times .8 = .72$$

- b. Find the probability that Josie will pass at least one of them.

Consider what passing at least one of them means.

Pass M or S or Both

$$\begin{aligned} P(M \text{ or } S) &= .9 + .8 - .72 \\ &= .98 \end{aligned}$$

$$= M \text{ or } S$$

5. At Baker High School, 100 students are involved in an afterschool community service program. Students can only sign up for one project. Currently, 25 students are involved in cleaning up nearby parks, 20 students are tutoring elementary students in math, and the rest of the students are working at helping out at a community recreational center. What is the probability that a randomly selected student is involved in cleaning up nearby parks or tutoring elementary students in math?

$$P(C \text{ or } T) = P(C) + P(T) - P(\text{Both})$$

$$= \frac{25}{100} + \frac{20}{100} = \frac{45}{100}$$

6. In contract negotiations between a local government agency and its workers, it is estimated that there is a 50% chance that an agreement will be reached on the salaries of the workers. It is estimated that there is a 70% chance that there will be an agreement on the insurance benefits. The events are believed to be independent.

- a. Find the probability that an agreement will be reached on both issues.

$$P(S \text{ and } I) = .5 \times .7 = .35$$

- b. Find the probability that an agreement will be reached on at least one of the issues.

$$P(S \text{ or } I) = .5 + .7 - .35 = .85$$

7. You spin a spinner with 10 equal sections that are numbered 1 through 10. Determine the probability that you get an odd number greater than 2.

1 2 | 3 4 5 6 7 8 9 10

$\frac{4}{10}$

$P(\text{odd}) \times P(>2)$

$\frac{5}{10} \times \frac{8}{10}$

$\frac{40}{100}$

Classwork #1, 5, 6, 9, 11, 12

$$p(\text{Unit Purchase}) = 8\%$$

1. **Bookstore I** What is the probability that three units in a row will make a purchase?

A) 0.000513

B) 0.068

C) 0.08

D) 0.24

$$P(P \cap P \cap P) = .08 \times .08 \times .08 = .000512$$

5. **Car seats** According to researchers at the University of Michigan, 21% of children under the age of 4 are not safely secured in car seats when riding in automobiles. They based this claim on 3 years of observations of over 21,000 children seen in cars in parking lots, gas stations, and other public areas. What is the approximate probability that they found the first unrestrained child less than four years old in the fifth car they checked?

- A) 0.21  
C) 0.79

- B) 0.082  
D) 0.0004

$$p(\text{unrestrained}) = .21$$

$$p(\text{restrained}) = .79$$

$$P(R \cap R \cap R \cap R \cap U) = .79 \times .79 \times .79 \times .79 \times .21$$
$$= .082$$

6. **Spinner** The plastic arrow on a spinner for a child's game stops rotating to point at a color that will determine what happens next. Which of the following probability assignments are possible? Explain what's wrong with the others.

Probabilities of ...				
	Red	Yellow	Green	Blue
a)	0.25	+ 0.25	+ 0.25	+ 0.25 = 1.00
b)	0.10	+ 0.20	+ 0.30	+ 0.40 = 1.00
c)	0.20	+ 0.30	+ 0.40	+ 0.50 = 1.40
d)	0	0	1.00	0 = 1.00
e)	0.10	0.20	1.20	-1.50

can't have prob. > 1

No b/c don't add up to 1  
No b/c can't have (-) prob and don't add to 1

9. **Failing fathers?** A Pew Research poll asked U.S. adults whether fathers today were doing as good a job of fathering as fathers of 20–30 years ago. Here's how they responded:

Response	Percentage
Better	21%
Same	28%
Worse	47%
No opinion	4%

If we select a respondent at random from this sample,

- a) what is the probability that the selected person responded "No Opinion"? 4%
- b) what is the probability that the person responded the "Same" or "Better"?

$$28\% + 21\% = 49\%$$

11. **Fathers revisited** Consider again the results of the poll about fathering discussed in Exercise 9. If we select two people at random from this sample,

- a) what is the probability that both think fathers are better today?  $P(B \cap B) = .21 \times .21 = .0441$   $P(\text{Better}) = .21$
- b) what is the probability that neither thinks fathers are better today?  $P(\text{Not } B) = 1 - P(B) = 1 - .21 = .79$   
 $P(\text{Not } B \cap \text{Not } B) = .79 \times .79 = .6241$
- c) what assumption did you make in computing these probabilities? assuming independent event
- d) explain why you think that assumption is reasonable.

2 people randomly chosen - each has own opinion



**12. Car repairs** A consumer organization estimates that over a 1-year period 17% of cars will need to be repaired once, 7% will need repairs twice, and 4% will require three or more repairs. What is the probability that a car chosen at random will need

a) no repairs?  $P(0R) = 1 - .28 = .72$

b) no more than one repair?  $P(0) + P(1)$

c) some repairs?

$$P(1) + P(2) + P(3^+)$$

$$.17 + .07 + .04 = .28$$

$$\text{or } 1 - P(0R) = 1 - .72 = .28$$

$$\begin{aligned} P(1R) &= .17 \\ P(2R) &= .07 \\ P(3^+R) &= .04 \\ P(0R) &= \end{aligned}$$

$$.72 + .17 = .89$$

## Homework:

Pg. 320 - 321

#4, 7, 18, 20, 22

(in Packet)

4. **Pop quiz** Your teacher gives one pop quiz each week (Monday through Friday). You are studying on Tuesday evening, and realize you haven't had a quiz yet this week. Assuming that your teacher decides which day to have a quiz at random, what is the probability that you *don't* have a quiz tomorrow?

A)  $\frac{1}{5}$

B)  $\frac{4}{5}$

C)  $\frac{2}{3}$

D)  $\frac{1}{3}$

7. **Scratch off** Many stores run “secret sales”: Shoppers receive cards that determine how large a discount they get, but the percentage is revealed by scratching off that black stuff (what *is* that?) only after the purchase has been totaled at the cash register. The store is required to reveal (in the fine print) the distribution of discounts available. Which of these probability assignments are legitimate? Explain what’s wrong with the others.

Probabilities of ...				
	10% off	20% off	30% off	50% off
a)	0.20	0.20	0.20	0.20
b)	0.50	0.30	0.20	0.10
c)	0.80	0.10	0.05	0.05
d)	0.75	0.25	0.25	-0.25
e)	1.00	0	0	0

18. **Vehicles** Suppose that 46% of families living in a certain county own a car and 18% own an SUV. The Addition Rule might suggest, then, that 64% of families own either a car or an SUV. What's wrong with that reasoning?

20. **Speeders** Traffic checks on a certain section of highway suggest that 60% of drivers are speeding there. Since  $0.6 \times 0.6 = 0.36$ , the Multiplication Rule might suggest that there's a 36% chance that two vehicles in a row are both speeding. What's wrong with that reasoning?

22. **M&M's** The Masterfoods company says yellow candies make up 20% of their plain M&M's, red another 20%, and orange, blue, and green each make up 10%. The rest are brown. If you pick an M&M at random, what is the probability that
- a) it is brown?
  - b) it is yellow or orange?
  - c) it is not green?
  - d) it is striped?