

1. A number is selected randomly from a container containing all the integers from 10 to 50. Find:

a. $P(\text{even} \mid \text{greater than } 40) = \frac{5}{10} = \frac{1}{2}$

b. $P(\text{greater than } 40 \mid \text{even}) = \frac{5}{21}$

2. In a school, the probability that a student takes environmental science and geography is 0.25. The probability that a student takes environmental science is 0.72. What is probability that a student takes geography given that the student is taking environmental science?

$$P(G|ES) = \frac{P(ES \text{ and } G)}{P(ES)} = \frac{.25}{.72} = 34.7\%$$

3. Americans recycle increasing amounts through municipal waste collection. The table shows the collection data for 2007.

Municipal Waste Collected
(millions of tons)

Material	Recycled	Not Recycled	
Paper	45.2	37.8	83
Metal	7.2	13.6	20.8
Glass	3.2	10.4	13.6
Plastic	2.1	28.6	30.7
Other	21.7	46.3	68

Source: U.S. Environmental Protection Agency
79.4 136.7 216.1

a. What is the probability that a sample of recycled waste is paper?

$$45.2 / 79.4 = 56.9\%$$

b. What is the probability that a sample of recycled waste is plastic?

$$2.1 / 79.4 = 2.6\%$$

c. What is the probability that a sample of glass is recycled?

$$3.2 / 13.6 = 23.5\%$$

4. Use the table to find each probability.

a. $P(\text{passed} \mid \text{studied}) = 8/9$

b. $P(\text{did not study} \mid \text{failed}) = 6/7$

	Passed	Failed	Totals
Studied	8	1	9
Did not Study	3	6	9
Totals	11	7	18

5. Use the table to find each probability.

a. Passed given that they took the preparatory class.

$$14/17$$

b. Did not pass given that they did not take the preparatory class.

$$6/17$$

	Preparatory Class	No Preparatory Class	Totals
Passed Exams	14	11	25
Did not Pass Exams	3	6	9
Totals	17	17	34

6. Suppose you select a number at random from the sample space {5, 6, 7, 8, 9, 10, 11, 12, 13, 14}. Find each probability.

a. $P(7) = \frac{1}{10}$

b. $P(5 \text{ or } 13) = \frac{1}{5}$

c. $P(\text{greater than } 10) = \frac{2}{5}$

d. $P(\text{multiple of } 30) = 0$

e. $P(\text{less than } 7 \text{ or greater than } 10) = \frac{3}{5}$

f. $P(\text{greater than } 6 \text{ and less than } 12) = \frac{1}{2}$

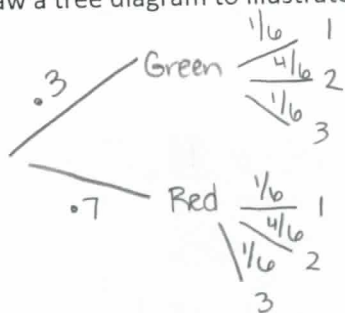
g. $P(\text{less than } 10 \mid \text{less than } 13) = \frac{5}{8}$

h. $P(\text{greater than } 8 \mid \text{less than } 11) = \frac{1}{3}$

i. $P(\text{greater than } 7 \mid \text{greater than } 12) = \frac{1}{1}$

7. There is a bag that contains 3 green ball and 7 red balls. You reach into the bag and draw one of the balls. You then roll a 6-sided die that has the numbers 1, 2, 2, 2, 2, 3 on the sides.

a. Draw a tree diagram to illustrate the possible outcomes.



G, 1	0.05
G, 2	0.2
G, 3	0.05
R, 1	0.12
R, 2	0.46
R, 3	0.12
	<hr/>
	1

b. Find $P(\text{roll a } 2) = 0.66$

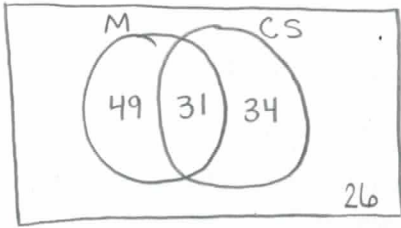
c. Find $P(\text{green and roll } 1) = 0.05$

d. Find $P(\text{red or roll } 3) = 0.05 + 0.12 + 0.46 + 0.12 = 0.75$

e. Find $P(\text{red} \mid \text{roll } 2) = \frac{0.46}{0.66} = 0.70$

8. In a class of 140 students, 80 are taking math, 65 are taking computer science, and 31 are taking both.

Draw a Venn diagram that represents the situation.



One student is picked at random. Find each probability.

a. $P(\text{not taking math}) = \frac{60}{140} = \frac{3}{7}$

b. $P(\text{taking math but not computer science}) = \frac{49}{140} = \frac{7}{20}$

c. $P(\text{taking neither math nor computer science}) = \frac{26}{140} = \frac{13}{70}$

d. $P(\text{taking math} | \text{taking computer science}) = \frac{31}{65}$

9. There are a total of 100 students in grades ages 6, 7, and 8.

- 37 of these students are female.
- 11 6th graders are male.
- 21 7th graders are female.
- There are 30 8th graders, 18 are male.

a. Construct a two-way table that represents the situation.

	6 th	7 th	8 th	
Male	11	34	18	63
Female	4	21	12	37
	15	55	30	100

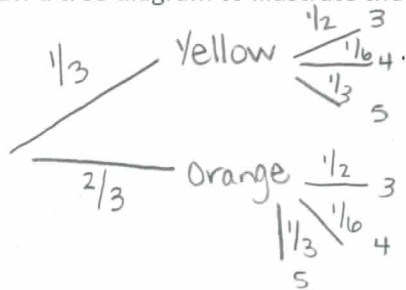
b. $P(7\text{th grade}) = \frac{55}{100}$

c. $P(6\text{th grade} | \text{female}) = \frac{4}{37}$

d. $P(\text{male} | 8\text{th grade}) = \frac{18}{30} = \frac{3}{5}$

10. There is a bag that contains 2 yellow marbles and 4 orange marbles. You reach into the bag and draw one of the marbles. You then roll a 6-sided die that has the numbers 3, 3, 3, 4, 5, 5 on the sides.

a. Draw a tree diagram to illustrate the possible outcomes.



Y, 3	$\frac{1}{6}$
Y, 4	$\frac{1}{18}$
Y, 5	$\frac{1}{9}$
O, 3	$\frac{1}{3}$
O, 4	$\frac{1}{9}$
O, 5	$\frac{2}{9}$
T	

b. $P(\text{roll a 3}) = \frac{1}{6} + \frac{1}{3} = \boxed{\frac{1}{2}}$

c. $P(\text{yellow and roll 5}) = \boxed{\frac{1}{9}}$

d. $P(\text{orange or 4}) = \frac{1}{18} + \frac{1}{3} + \frac{1}{9} + \frac{2}{9} = \boxed{\frac{13}{18}}$

e. $P(\text{yellow} | \text{roll 5}) = \frac{1/9}{1/3} = \boxed{\frac{1}{3}}$

11. Tara estimates that the probability of passing Math is 90%, Speech is 80%, and Spanish is 95%. What is her probability of:

a. passing all 3? $P(A \text{ and } B \text{ and } C) = P(A) \cdot P(B) \cdot P(C)$
 $= (.9)(.8)(.95) = 68.4\%$

b. failing all 3? $P(\text{not } A \text{ and not } B \text{ and not } C) = (.1)(.2)(.05) = .01\%$

c. passing at least 1? $1 - P(\text{none}) = 1 - .001 = 99.9\%$

d. passing exactly 1?

$P(A \text{ and not } B \text{ and not } C) = (.9)(.2)(.05) = .009$

$P(\text{not } A \text{ and } B \text{ and not } C) = (.1)(.8)(.05) = .004$

$P(\text{not } A \text{ and not } B \text{ and } C) = (.1)(.2)(.95) = .019$

3.2%