CHAPTER 4 TEST
FORM A

1. A random sample of 317 new Smile Bright electric toothbrushes showed 19 were defective.
   (a) How would you estimate the probability that a new Smile Bright electric toothbrush is defective? What is your estimate?
   (b) What is your estimate for the probability that a Smile Bright electric toothbrush is not defective?
   (c) Either an electric toothbrush is defective or not. What is the sample space in this problem. Do the probabilities assigned to the sample space add up to one?

2. If you roll a single fair die and count the number of dots on top, what is the probability of getting a number less than 3 on a single throw?

3. You roll two fair dice, a blue one and a yellow one.
   (a) Find \( P(\text{even number on the blue die and 3 on the yellow die}) \).
   (b) Find \( P(3 \text{ on the blue die and even number on the yellow die}) \).
   (c) Find \( P(\text{even number on the blue die and 3 on the yellow die}) \) or \( P(3 \text{ on the blue die and even number on the yellow die}) \).

4. An urn contains 12 balls identical in every respect except color. There are 3 red balls, 7 green balls, and 2 blue balls.
   (a) You draw two balls from the urn, but replace the first ball before drawing the second. Find the probability that the first ball is red and the second is green.
   (b) Repeat part (a), but do not replace the first ball before drawing the second.

5. Robert is applying for a bank loan to open up a pizza franchise. He must complete a written application, and then be interviewed by bank officers. Past records for this bank show that the probability of being approved in the written part is 0.63. Then the probability of being approved by the interview committee is 0.85, given the candidate has been approved on the written application. What is the probability Robert is approved on both the written application and the interview?
CHAPTER 4, FORM A, PAGE 2

6. A hair salon did a survey of 360 customers regarding satisfaction with service and type of customer. A walk-in customer is one who has seen no ads and not been referred. The other customers either saw a TV ad or were referred to the salon (but not both). The results follow.

<table>
<thead>
<tr>
<th></th>
<th>Walk-In</th>
<th>TV Ad</th>
<th>Referred</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Satisfied</td>
<td>21</td>
<td>9</td>
<td>5</td>
<td>35</td>
</tr>
<tr>
<td>Neutral</td>
<td>18</td>
<td>25</td>
<td>37</td>
<td>80</td>
</tr>
<tr>
<td>Satisfied</td>
<td>36</td>
<td>43</td>
<td>59</td>
<td>138</td>
</tr>
<tr>
<td>Very Satisfied</td>
<td>28</td>
<td>31</td>
<td>48</td>
<td>107</td>
</tr>
<tr>
<td>Total</td>
<td>103</td>
<td>108</td>
<td>149</td>
<td>360</td>
</tr>
</tbody>
</table>

Assume the sample represents the entire population of customers. Find the probability that a customer is

(a) Not satisfied
(b) Not satisfied and walk-in
(c) Not satisfied, given referred
(d) Very satisfied
(e) Very satisfied, given referred
(f) Very satisfied and TV ad
(g) Are the events satisfied and referred independent or not? Explain your answer.

6. (a) __________________________
   (b) __________________________
   (c) __________________________
   (d) __________________________
   (e) __________________________
   (f) __________________________
   (g) __________________________

7. A computer package sale comes with two different choices of printers and four different choices of monitors. If a store wants to display each package combination that is for sale, how many packages must be displayed? Make a tree diagram showing the outcomes for selecting printer and monitor.

7. __________________________

8. In how many ways can the 40 members of a 4H club select a president, a vice-president, a secretary, and a treasurer?

8. __________________________

9. In how many different ways can a person choose three movies to see in a theater playing 11 movies.

9. __________________________
CHAPTER 4 TEST
FORM B

1. A Student Council is made up of 4 women and 6 men. One of the women is president of the Council. A member of the council is selected at random to report to the Dean of Student Life.

(a) What is the probability a woman is selected?  
(b) What is the probability a man is selected?  
(c) What is the probability that the president of the Student Council is selected?

2. If you roll a single fair die and count the number of dots on top, what is the probability of getting a number greater than 2 on a single throw?

3. You roll two fair dice, a white one and a red one.

(a) Find P(5 or 6 on the white die and odd number on the red die).  
(b) Find P(odd number on the white die and 5 or 6 on the red die).  
(c) Find P(5 or 6 on the white die and odd number on the red die) or P(odd number on the white die and 5 or 6 on the red die).

4. An urn contains 17 balls identical in every respect except color. There are 6 red balls, 8 green balls, and 3 blue balls.

(a) You draw two balls from the urn, but replace the first ball before drawing the second. Find the probability that the first ball is red and the second ball is green.

(b) Repeat part (a), but do not replace the first ball before drawing the second.

5. The Dean of Hinsdale College found that 12% of the female students are majoring in Computer Science. If 64% of the students at Hinsdale are women, what is the probability that a student chosen at random will be a woman majoring in Computer Science?
CHAPTER 4, FORM B, PAGE 2

6. The Committee on Student Life did a survey of 417 students regarding satisfaction with Student Government and class standing. The results follow:

<table>
<thead>
<tr>
<th>Freshman</th>
<th>Sophomore</th>
<th>Junior</th>
<th>Senior</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Satisfied</td>
<td>17</td>
<td>19</td>
<td>23</td>
<td>12</td>
</tr>
<tr>
<td>Neutral</td>
<td>61</td>
<td>35</td>
<td>32</td>
<td>38</td>
</tr>
<tr>
<td>Satisfied</td>
<td>23</td>
<td>49</td>
<td>43</td>
<td>65</td>
</tr>
<tr>
<td>Total</td>
<td>101</td>
<td>103</td>
<td>98</td>
<td>115</td>
</tr>
</tbody>
</table>

Assume the sample represents the entire population of students.
Find the probability that a student selected at random is

(a) Satisfied (with Student Government)  
6. (a) __________________________

(b) Satisfied, given the student is a Senior  
(b) __________________________

(c) Neutral  
(c) __________________________

(d) Neutral and Freshman  
(d) __________________________

(e) Neutral, given the student is a Freshman  
(e) __________________________

(f) Senior, given satisfied  
(f) __________________________

(g) Are the events, Freshman and neutral independent or not? Explain.  
(g) __________________________

7. There are 3 different routes that Alexander can walk from home to the post office and 2 different routes that he can walk from the post office to the bank. How many different routes can Alexander walk from home to the bank? Make a tree diagram showing the outcomes for selecting the routes.  
7. __________________________

8. A fishing camp has 16 clients. Each cabin at the camp will accommodate 5 fishermen. In how many different ways can the first cabin be filled with clients?  
8. __________________________

9. In how many different ways can a committee of four be selected from the 24 parents attending a school board meeting?  
9. __________________________
CHAPTER 4 TEST
FORM C

Write the letter of the response that best answers each problem.

1. A random sample of 420 new Ford trucks showed that 105 required repairs within the first warranty year.
   A. What is the estimate for the probability that a new Ford truck will need repairs within the first warranty year?
      (a) 105  (b) 0.75  (c) 315  (d) 0.25  (e) 0.20
   B. What is the estimate for the probability that a new Ford truck will not need repairs within the first warranty year?
      (a) 105  (b) 0.75  (c) 315  (d) 0.25  (e) 0.80

2. If you roll a single fair die and count the number of dots on top, what is the probability of getting an even number or a 5 on a single throw?
   (a) \(\frac{2}{3}\)  (b) \(\frac{1}{2} + \frac{1}{6}\)  (c) \(\frac{1}{12}\)  (d) \(\frac{5}{6}\)  (e) \(\frac{1}{3}\)

3. You roll two fair dice, a white one and a green one.
   A. Find \(P(\text{number greater than 2 on the white die and 4 on the green die}).\)
      (a) \(\frac{5}{6}\)  (b) \(\frac{5}{36}\)  (c) \(\frac{1}{9}\)  (d) \(\frac{1}{2}\)  (e) \(\frac{2}{9}\)
   B. Find \(P(4 \text{ on the white die and number greater than 2 on the green die}).\)
      (a) \(\frac{2}{9}\)  (b) \(\frac{1}{2}\)  (c) \(\frac{5}{6}\)  (d) \(\frac{5}{36}\)  (e) \(\frac{1}{9}\)
   C. Find \(P(\text{number greater than 2 on the white die and 4 on the green die})\)
      or \(P(4 \text{ on the white die and number greater than 2 on the green die}).\)
      (a) 1  (b) \(\frac{2}{9}\)  (c) \(\frac{5}{18}\)  (d) \(\frac{1}{81}\)  (e) \(\frac{25}{36}\)
CHAPTER 4, FORM C, PAGE 2

4. An urn contains 8 balls identical in every aspect except color. There is 1 red ball, 2 green balls, and 5 blue balls.

A. You draw two balls from the urn, but replace the first ball before drawing the second. Find the probability that the first ball is blue and the second is green.

4. A. __________

(a) \( \frac{5}{32} \)  (b) \( \frac{7}{8} \)  (c) \( \frac{51}{56} \)  (d) \( \frac{5}{28} \)  (e) \( \frac{3}{4} \)

B. Repeat part A, but do not replace the first ball before drawing the second.

B. __________

(a) \( \frac{5}{32} \)  (b) \( \frac{7}{8} \)  (c) \( \frac{51}{56} \)  (d) \( \frac{5}{28} \)  (e) \( \frac{3}{4} \)

5. The athletic coach found that 31% of the basketball players have an A average in school. If 2% of the students at the school are basketball players, what is the probability that a student chosen at random will be a basketball player with an A average?

5. __________

(a) 62%  (b) 0.62%  (c) 6.45%  (d) 0.0645%  (e) 0.0062%

6. A hospital administration did a survey of patients regarding satisfaction with care and type of surgery. The results follow:

<table>
<thead>
<tr>
<th></th>
<th>Heart</th>
<th>Hip</th>
<th>Knee</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Satisfied</td>
<td>7</td>
<td>12</td>
<td>2</td>
<td>21</td>
</tr>
<tr>
<td>Neutral</td>
<td>15</td>
<td>38</td>
<td>10</td>
<td>63</td>
</tr>
<tr>
<td>Satisfied</td>
<td>32</td>
<td>16</td>
<td>25</td>
<td>73</td>
</tr>
<tr>
<td>Very Satisfied</td>
<td>4</td>
<td>22</td>
<td>23</td>
<td>49</td>
</tr>
<tr>
<td>Total</td>
<td>58</td>
<td>88</td>
<td>60</td>
<td>206</td>
</tr>
</tbody>
</table>

Assume the sample represents the entire population of patients. Find the probability that a patient selected at random is

6. A. __________

A. Satisfied

(a) \( \frac{32}{206} \)  (b) 73  (c) \( \frac{122}{206} \)  (d) 122  (e) \( \frac{73}{206} \)
Part III: Sample Tests, Chapter 4

CHAPTER 4, FORM C, PAGE 3

B. Very satisfied and had knee surgery

(a) \( \frac{109}{206} \)  (b) \( \frac{11}{206} \)  (c) \( \frac{23}{206} \)  (d) \( \frac{23}{60} \)  (e) \( \frac{23}{60} \times \frac{23}{49} \)

B. _________

C. Neutral, given had hip surgery

(a) \( \frac{38}{88} \)  (b) \( \frac{88}{206} \)  (c) \( \frac{38}{206} \)  (d) \( \frac{38}{63} \)  (e) \( \frac{63}{88} \)

C. _________

D. A knee surgery patient

(a) 60  (b) 206  (c) \( \frac{146}{206} \)  (d) \( \frac{60}{206} \)  (e) \( \frac{2}{206} \)

D. _________

E. Satisfied, given had heart surgery

(a) \( \frac{73}{206} \)  (b) \( \frac{58}{73} \)  (c) \( \frac{32}{58} \)  (d) \( \frac{32}{206} \)  (e) \( \frac{32}{73} \)

E. _________

F. Not satisfied and had heart surgery

(a) \( \frac{7}{58} \)  (b) \( \frac{7}{206} \)  (c) \( \frac{7}{21} \)  (d) \( \frac{21}{206} \)  (e) \( \frac{58}{206} \)

F. _________

7. George has 4 ties, 3 shirts, and 2 pairs of pants. How many different outfits can he wear if he chooses one tie, one shirt, and one pair of pants for each outfit?

(a) 288  (b) 12  (c) 9  (d) 24  (e) 10

7. _________

8. In how many ways can 12 athletes be awarded a first-place medal, a second-place medal, and a third-place medal?

(a) 33  (b) 220  (c) 6  (d) 1728  (e) 1320

8. _________

9. In how many different ways can a student choose 3 out of 8 problems to complete on a take-home exam?

(a) 56  (b) 336  (c) 21  (d) 3.5  (e) 3

9. _________

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