# Part II Section 5 Practice Problems

**A.** The table below shows 200 shirts in terms of colors and size. **(All answers in percentage and round in 2 decimal)**

| | **B**lue | **R**ed | **W**hite |
|---|---|---|---|
| **L**arge | 50 | 40 | 20 |
| **S**mall | 40 | 20 | 30 |

If one shirt is randomly selected then find the following probability that

**1)** It is red or small Ans: 65%
**2)** It is white or large **Ans; 70%**
**3)** It is white or blue **Ans: 70%**
**4)** It is red or white or large **Ans: 80%**

**5)** If two shirts are randomly selected then find the probability that both shirts are small. **Ans:20.13%**

**6)** If two shirts are randomly selected then find the probability that both shirts are nonwhite. **Ans: 56.16%**
**All solutionss. on page 3.**

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**B**.
b) From a deck of 52 cards, If we draw one card at random, then what is the probability that it is **A**ce or **R**ed?
***Ans: 53.84 %***

a) From a deck of 52 cards, If we draw one card at random, then what is the probability that it is **A**ce or **K**ing?
***Ans: 15.39***

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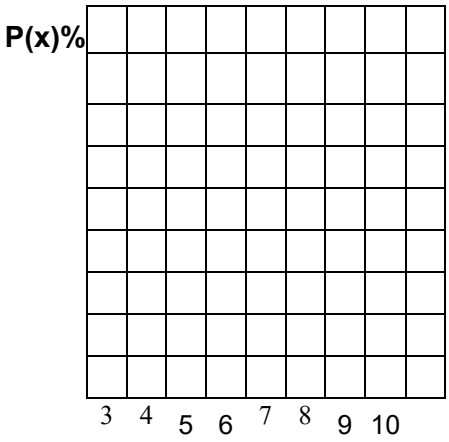
**C**. Let **Random Variable X** = the number of digital **camcorders sold** in a given day at an electronic store.

| **B** | | | |
|---|---|---|---|
| **x** | **f** | | |
| 3 | 8 | | |
| 4 | 11 | | |
| 5 | 14 | | |
| 6 | 19 | | |
| 7 | 20 | | |
| 8 | 12 | | |
| 9 | 9 | | |
| 10 | 7 | | |
| | | 1.00 = ? | |
| ***Mean = 6.39*** | | | |




- Complete the table, draw probability distribution (**Answers/P.16**) and find the probability that,

1. At **least** there will be 7 **camcorders sold** in a given day. **Ans: 48 %**
2. At **most** there will be 8 **camcorders sold** in a given day. **Ans: 84 %**
3. Find the **mean** of number of camcorders sold in a given day. ***Mean = 6.39***

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**C**. A $0.5 slot machine in a casino has a winning prize of $10 for each play with winning probability $1/100$. What are the expected results for the players and the house each time the game is played. How much will be the expected to generate revenue if a typical casino has 100 slot machines and each slot machine is played 1000 times a day and 360 days **Ans: $142,200 per year**.

# Counting

**1)** If a password should consist of 2 letters first and 3 digits after, then how many different passwords are possible? L L D D D 1) ***676,000***

**2)** If a password should consist of non-repeating of 2 letters first and non-repeating 3 digits after, then how many different passwords are possible? 2) ***468,000***

L L D D D

**3)** How many different 3-letter words can be written ending with vowels (a,e,i,o,u)? 3) ***3,380***

_____ , _____ , _____

**4)** How many different 3-letter words can be written not ending with vowels (a,e,i,o,u)? 4) ***14,196***

_____ , _____ , _____

**5)** How many different 3-digits odd number can be written by using 0,2,1,3,7,8 digits? 5) ***90***

_____ , _____ , _____

**6)** How many different 3-letter words can be written ending with letters (e, n, d)? 6) ***2,028***

_____ , _____ , _____

**7)** How many different 3-digits even number can be written by using 0,2,1,3,7,8 digits? 7) ***90***

_____ , _____ , _____

**8)** In how many ways Joe can dress up, if he has 6 shirts, 7, pants, and 5 pair of shoes? 8) ***210***

_____ , _____ , _____

**9)** If a password should consist of non-repeating of 3 letters first and non-repeating 2 digits after, then how many different passwords are possible? 9) ***1,404,000***

_____ , _____ , _____, _____ , _____

**10)** If a password should consist of 2 letters first and 2 digits after, then how many different passwords are possible? 10) ***67,600***

**11)** How many different 3-letter words can be written ending with letters (a,c,e,t,o,p)? 11) ***4,056***

_____ , _____ , _____

**12)** How many different 3-digits even number divisible by 5 can be written by using 0,2,1,3,7,5,8 digits? 12) ***42***

_____ , _____ , _____

**13)** How many different 3-digits number divisible by 5 can be written by using 0,2,1,3,7,5,8 digits? 13) ***84***

_____ , _____ , _____

**14)** How many different area codes can we have? 14) ***1000***

_____ , _____ , _____

**D**. In

# Answers

| | B | R | W | |
|---|---|---|---|---|
| L | 50 | 40 | 20 | ***110*** |
| S | 40 | 20 | 30 | ***90*** |
| | ***90*** | ***60*** | ***50*** | ***200*** |

**1)** $P(R \text{ or } S) = \frac{60}{200} + \frac{90}{200} - \frac{20}{200} = \frac{130}{200} = 65\%$ **2)** $P(W \text{ or } L) = \frac{50}{200} + \frac{110}{200} - \frac{20}{200} = \frac{140}{200} = 70\%$

**3)** $P(W \text{ or } B) = \frac{50}{200} + \frac{90}{200} - \frac{0}{200} = \frac{140}{200} = 70\%$

**4)** $P(R \text{ or } W \text{ or } L) = \frac{60}{200} + \frac{50}{200} + \frac{110}{200} - \frac{0}{200} - \frac{40}{200} - \frac{20}{200} = \frac{160}{200} = 80\%$

**5)** $P(\text{both small}) = P(\text{first small and second small}) = \frac{90}{200} \bullet \frac{89}{199} = 20.1265\%$

**6)** $P(\text{both non white}) = P(\text{first non white and second non white}) = \frac{150}{200} \bullet \frac{149}{199} = 56.156\%$

**1)** 65% **2)** 70% **3)** 70% **4)** 80% **5)** 20.13% **6)** 56.16%

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$a)\ P(A \text{ or } R) = P(A) + P(R) - P(A \text{ and } R) = \frac{4}{52} + \frac{26}{52} - \frac{2}{52} = \frac{28}{52} = \frac{7}{13} = 53.84\%$

$b)\ P(A \text{ or } K) = P(A) + P(K) - P(A \text{ and } K) = \frac{4}{52} + \frac{4}{52} - \frac{0}{52} = \frac{8}{52} = \frac{2}{13} = 15.39\%$

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| B | | | | |
|---|---|---|---|---|
| **x** | **f** | **P(x)%** | **x P(x)** | **$X^2P(x)$** |
| 3 | 8 | 0.08 | 0.24 | 0.72 |
| 4 | 11 | 0.11 | 0.44 | 1.76 |
| 5 | 14 | 0.14 | 0.70 | 3.50 |
| 6 | 19 | 0.19 | 1.14 | 6.84 |
| 7 | 20 | 0.20 | 1.40 | 9.80 |
| 8 | 12 | 0.12 | 0.96 | 7.68 |
| 9 | 9 | 0.09 | 0.81 | 7.29 |
| 10 | 7 | 0.07 | 0.70 | 7.00 |
| | 100 | 1.00 | ***6.39*** | 44.59 |
| ***Mean = 6.39*** | | | ***St. Dev = 1.94*** | |

| **Outcome** | $x$ | $p(x)$ | $x\,p(x)$ |
|---|---|---|---|
| Win | \$10 | 1/100 | \$.10 |
| Lose | \$ -0.5 | 99/100 | \$-.495 |
| | | $\sum p(x) = 1$? | $\sum xp(x) = \$$ **-.395** |
| (.395)(1000)(100)(360) = \$14,220,000 | | | |

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# Counting

**1)** If a password should consist of 2 letters first and 3 digits after, then how many different passwords are possible? 2) ***676,000***

$26 \times \ 26 \times \ 10 \times 10 \times 10 =$ **676,000**

**2)** If a password should consist of non-repeating of 2 letters first and non-repeating 3 digits after, then how many 1) ***468,000***

different passwords are possible?

$26 \times 25 \times 10 \times 9 \times 8 =$ **468,000**

**3)** How many different 3-letter words can be written ending with vowels (a,e,i,o,u)? 3) ***3,380***

$26 \times 26 \times 5 =$ **3,380**

**4)** How many different 3-letter words can be written not ending with vowels (a,e,i,o,u)? 4) ***14,196***

$26 \times 26 \times 21 =$**14,196**

**5)** How many different 3-digits odd number can be written by using 0,2,1,3,7,8 digits? 5) ***90***

$5 \times 6 \times 3 =$ **90**

**6)** How many different 3-letter words can be written ending with letters (e, n, d)? 6) ***2,028***

$26 \times 26 \times 3 =$ **2,028**

**7)** How many different 3-digits even number can be written by using 0,2,1,3,7,8 digits? 7) ***60***

$5 \times 6 \times 3 =$ **90**

**8)** In how many ways Joe can dress up, if he has 6 shirts, 7, pants, and 5 pair of shoes? 8) ***210***

$6 \times 7 \times 5 =$ **210**

**9)** If a password should consist of non-repeating of 3 letters first and non-repeating 2 digits after, then how many different passwords are possible? 9) ***1,404,000***

$26 \times 25 \times 24 \times 10 \times 9 = 1{,}404{,}006$

**10)** If a password should consist of 2 letters first and 2 digits after, then how many different passwords are possible? 10) ***67,600***

$26 \times 26 \times 10 \times 10 =$ **67,600**

**11)** How many different 3-letter words can be written ending with letters (a,c,e,t,o,p)? 11) ***4,056***

$26 \times 26 \times 6 =$ **4,056**

**12)** How many different 3-digits even number divisible by 5 can be written by using 0,2,1,3,7,5,8 digits? 12) ***42***

$6 \times 7 \times 1 =$ **42**

**13)** How many different 3-digits number divisible by 5 can be written by using 0,2,1,3,7,5,8 digits? 13) ***84***

$6 \times 7 \times 2 =$ **82**

**14)** How many different area codes can we have? 14) ***1000***

$10 \times 10 \times 10 =$ **1000**