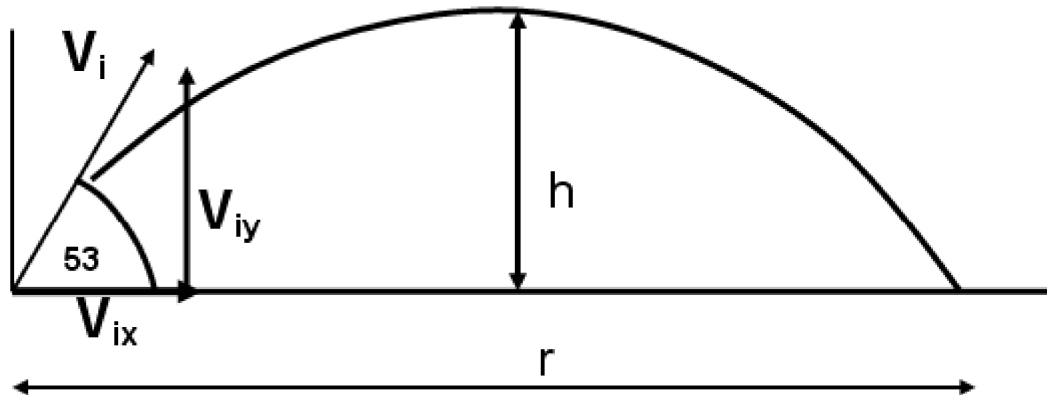## Unit 4.1 & 4.2 Study Guide

Make sure you box your final answers.

1. A ball is fired from a device, at a rate of 200 ft/sec, with an angle of 53 degrees to the ground. *Round all answers to the nearest whole number.*

    a) What is the initial horizontal velocity?
    b) What is the initial vertical velocity?
    c) What is the ball's range (r)?

2. What is the probability of a twenty sided dice landing on an even number?

3. What is the probability of tossing a six sided die twice and it landing on a 6 both times?

4. What is the probability of rolling a 3 or a 2 on a single 6 sided dice roll?

5. The actual performance of a POE student's ballistic device was recorded and plotted for comparison against its calculated ideal performance. Study the graph below and use it to answer the following questions.

Actual vs. Ideal Trajectory Motion Device Performance
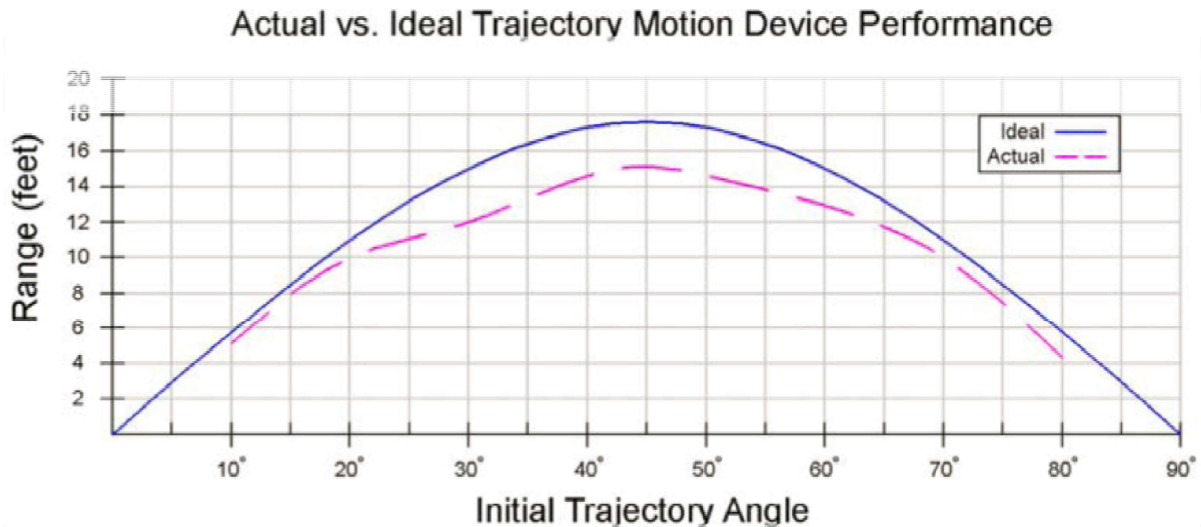
a) What two initial trajectory angles could be used to shoot the projectile an ***ideal*** distance of 6 feet?
b) What would the ***actual*** initial velocity be if it were calculated using the results of a 30 degree firing angle? Round your answer to one decimal point.
c) What TWO factors could have reasonably prevented the actual data from matching the ideal data?

6. An engineer is evaluating the number of loose metal shavings that their automated assembly line is producing on their product to determine if there is a defect in this process. Taking a sample of 10 products, the engineer's data is listed below:

9, 2, 5, 4, 12, 10, 9, 6, 9, 4

Round any non-integer answers to the nearest tenths

a) Calculate the mean, median, and mode of the data set.
b) Calculate the range of the data set.
c) Calculate the sample standard deviation of the data set.
d) According to the automated assembly line manufacturer, they have 3 vendors that supply the saw blades, when defective, are linked to producing excess loose metal shavings in the products. The manufacturer has provided data regarding how much each vendor supplies, and their estimates on the number of blades each vendor provides that are defective.

Vendor	Supply %	Defective %
Saws are Us	50	1.0
Very Sharp Systems	40	0.5
Blades, Blades & Beyond	10	1.5

If a saw blade was chosen at random and was defective, what is the probability that the blade was produced by the vendor, *Blades, Blades & Beyond*?

7. In the spreadsheet snapshot below, what Excel formula would you type into the highlighted box in order to calculate the mean of the yellow colored candies?

	A	B	C	D	E	F	G	H
1						Candy Statistics		
2	Trial Number	1	2	......	19		Mean	Med
3	Yellow	7	7	7	7			
4	Red	4	4	4	4			
5	Blue	5	5	5	5			
6	Brown	25	23	23	29			
7	Green	7	4	4	4			
8	Orange	5	3	3	4			
9	Package Total							
10	Package Volume							

Microsoft Excel - CandyStatistics
File   Edit   View   Insert   Format   Tools   Data   Window   Help
Rows
Columns
Worksheet
G3
100%
Reply with Changes... End Review...   Snagit

8. What is the probability of tossing a coin four times and it landing tails up three times?

9. An quality control engineering working at Tesla measured a sample of front doors that were coming off the assembly line to make sure that the gap between front and rear doors were not too large. He recorded the following front driver door widths (in inches) in the table below.

Create a histogram of the data below with at least 5 equally sized bins:

35.5	36.5	36.0
34.5	36.5	36.0
35.5	35.5	35.5
35.5	37.0	37.5
38.0	34.5	35.5
35.5	36.0	37.0
38.0	37.5	37.0
35.0	35.5	35.5
35.5	35.5	35.5
36.0	36.0	36.0
36.0	36.0	36.0

Unit 4.1 & 4.2 Study Guide
Answer Section

ESSAY

1. ANS:
   a) Vix = 200ft/sec(cos53) = 120 ft/sec;
   b) Viy = 200ft/sec(sin53) = 160ft/sec
   c) X = 1195 ft

   PTS: 1
2. ANS:
   1/2

   PTS: 1
3. ANS:
   1/6 X 1/6 = 1/36

   PTS: 1
4. ANS:
   1/6 + 1/6 = 1/3

   PTS: 1
5. ANS:
   a) 10 and 80 degrees
   b) 21.11 ft
   c) Air resistance, variable friction in launching device, variable wind conditions etc.

   PTS: 1
6. ANS:
   a) Mean - 7, median - 7.5, mode - 9
   b) Range - 10
   c) s - 3.2
   d) 0.18 or 0.2 or 17.6%

   PTS: 1
7. ANS:
   =AVERAGE(B3:E3)

   PTS: 1

8. ANS:

$$P_3 = \frac{(4!)(0.5^3)(0.5^{4-3})}{3!(4-3)!} =$$

$$= \frac{(24)(0.125)(0.5)}{6(1)} = 0.25$$

0.25

PTS: 1

9. ANS:
1

PTS: 1