DATA

Mathematics Department ASSESSMENT

THIS IS THE DATA I USED

ESSENTIAL MATHEMATICS UNIT 4– Semester 2 2017

Baldivis Secondary College

Task 3: Statistical Investigation of PROBABILITY SIMULATION
7% of final grade

Time Allowed: (AT HOME) one weekend

Marks: /15

Full Name:_____

%

QUESTION ONE

Get a plastic water bottle and fill it **one quarter** with water. You will use this bottle to flip and you will record the amount of times that it lands upright. Each TEN times you flit it, record JUST THE NUMBER OF TIMES IT LANDS UPRIGHT. Flip it as many times as possible over the course of the assessment period. The more data that you gather, the more robust your investigation will be. You need to flip it 100 times.

(5 marks)

ONE QUARTER FULL BOTTLE			
Flip Number	Number of Successful Landings	Flip Number	Number of Successful Landings
01-10	2	51-60	0
11-20	0	61-70	0
21-30	2	71-80	2
31-40	4	81-90	3
41-50	5	91-100	1

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QUESTION TWO

Get a plastic water bottle and fill it **one half** with water. You will use this bottle to flip and you will record the amount of times that it lands upright. Each TEN times you flit it, record JUST THE NUMBER OF TIMES IT LANDS UPRIGHT. Flip it as many times as possible over the course of the assessment period. The more data that you gather, the more robust your investigation will be. You need to flip it 100 times.

(5 marks)

ONE HLF FULL BOTTLE			
Flip Number	Number of Successful Landings	Flip Number	Number of Successful Landings
01-10	1	51-60	1
11-20	2	61-70	0
21-30	3	71-80	1
31-40	2	81-90	1
41-50	0	91-100	0

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QUESTION THREE

Get a plastic water bottle and fill it **three quarters** with water. You will use this bottle to flip and you will record the amount of times that it lands upright. Each TEN times you flit it, record JUST THE NUMBER OF TIMES IT LANDS UPRIGHT. Flip it as many times as possible over the course of the assessment period. The more data that you gather, the more robust your investigation will be. You need to flip it 100 times.

(5 marks)

THREE QUARTERS FULL BOTTLE			
Flip Number	Number of Successful Landings	Flip Number	Number of Successful Landings
01-10	0	51-60	1
11-20	1	61-70	0
21-30	0	71-80	0
31-40	3	81-90	1
41-50	0	91-100	3

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Mathematics Department ASSESSMENT

ESSENTIAL MATHEMATICS UNIT 4– Semester 3 2017

Baldivis Secondary College

Task 11: Statistical Investigation – PROBABILITY SIMULATION
7% of final grade

Time Allowed: (IN CLASS) 60 minutes

Marks: **/60**

Full Name:_____

%

QUESTION ONE

The data that you gathered over the weekend is the historical actual real data related to your ability to successfully flip a bottle containing varying amounts of water. Complete the following table.

(6 marks)

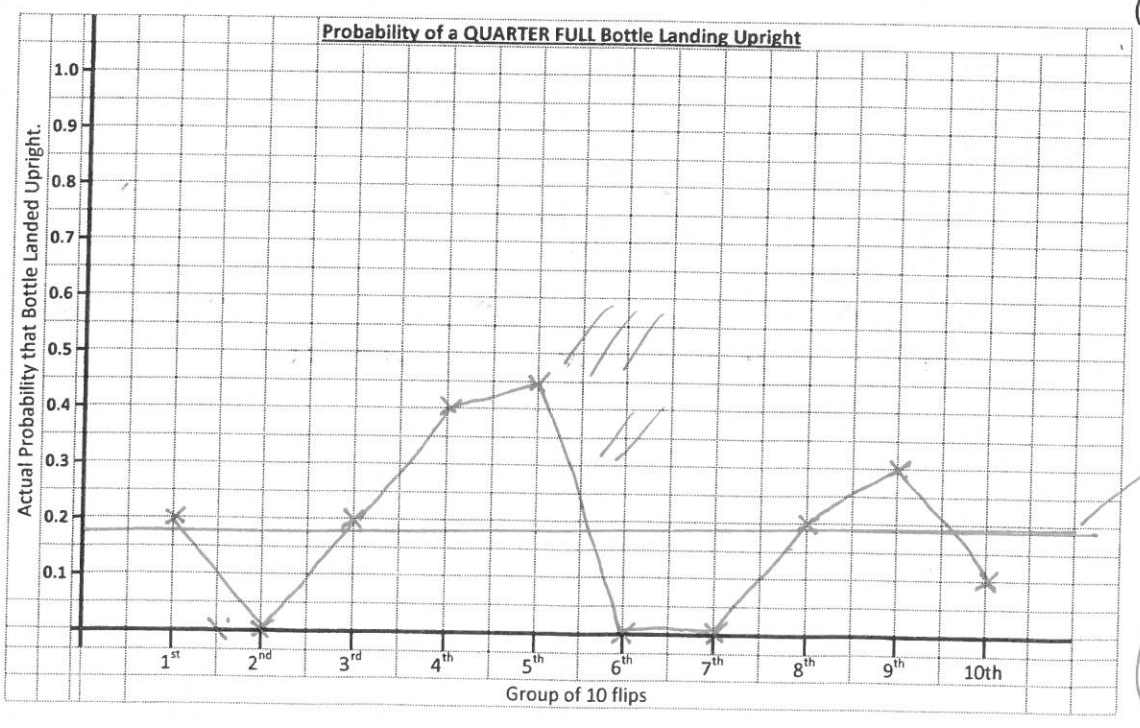
Table 1 Historical Data Summary

	Total Number of Flips	Total Number SUCCESSFUL flips	Decimal Value of SUCCESSFUL Flips
QUARTER FULL BOTTLE	100	19	0.19
HALF FULL BOTTLE	100	11	0.11
THREE QUARTER FULL BOTTLE	100	9	0.09

For each group of ten flips, you recorded the NUMBER of successful flips out of ten. This could be easily converted to a decimal. For example, 1 successful flip out of ten is represented as 0,1.

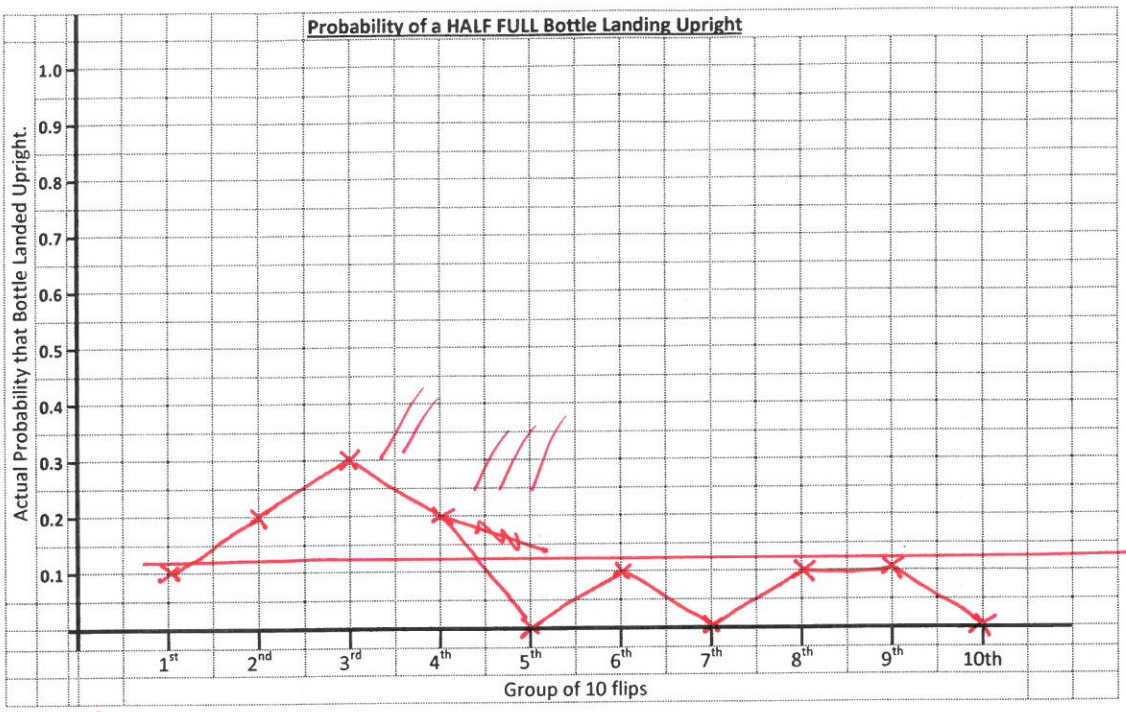
a) For the QUARTER FULL bottle, plot the number of successful flips (as a decimal) against the flip numbers on the following graph. (Plot each value with an *x* and join up with a ruler).

(5 marks)



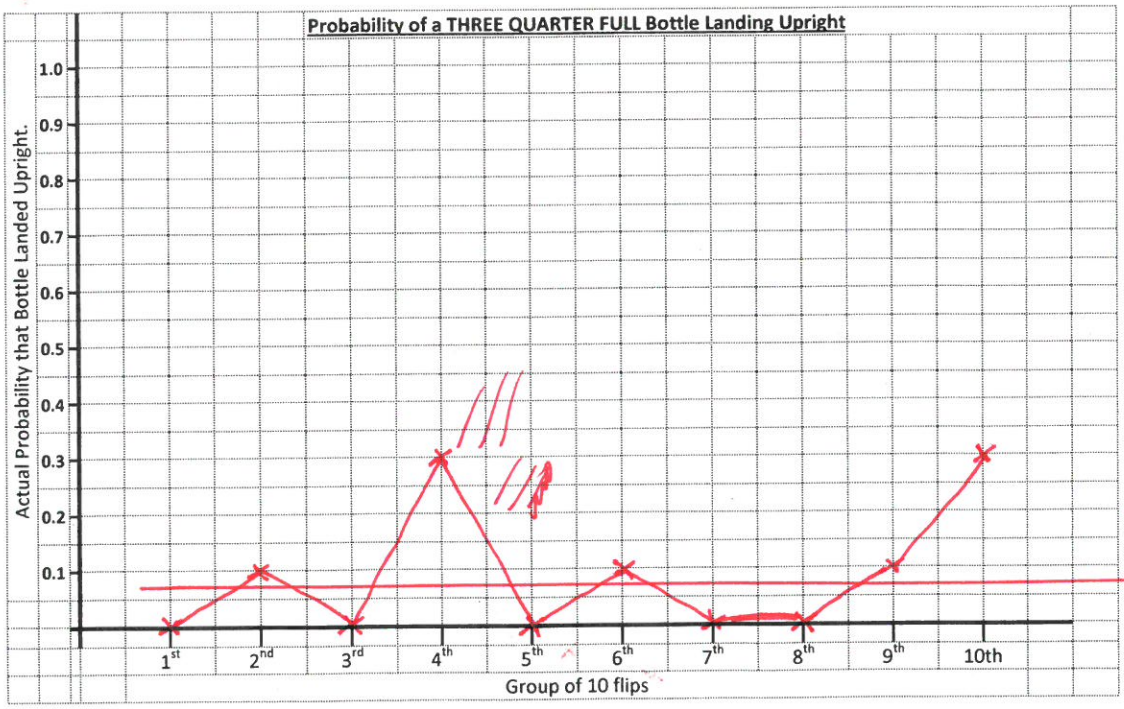
b) For the HALF FULL bottle, plot the number of successful flips (as a decimal) against the flip numbers on the following graph. (Plot each value with an *x* and join up with a ruler).

(5 marks)



c) For the THREE QUARTER FULL bottle, plot the number of successful flips (as a decimal) against the flip numbers on the following graph. (Plot each value with an *x* and join up with a ruler).

(5 marks)



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d) For each of the three graphs above, inspect to see if there is an obvious trend line and if so, draw it in on each graph and label it clearly. If there is no obvious trend line, tick the appropriate box in the table below.

(3 marks)

	OBVIOUS TREND LINE Indicated on Graph	NO OBVIOUS TREND LINE
QUARTER FULL BOTTLE	✓	
HALF FULL BOTTLE	✓	
THREE QUARTER FULL BOTTLE	✓	

e) Comment on the shapes of the three graphs above. Use some or all of the following words or phrases in each statement. {symmetrical, bias, trend line, experience, improve with time, sample size}

i) QUARTER FULL BOTTLE

SYMMETRICAL ≈ $y = 0.2$ TRENDLINE

(2 marks)

ii) HALF FULL BOTTLE

NOT SO SYMMETRICAL FROM MY DATA

BUT ≈ $y = 0.12$ TRENDLINE.
0.11

(2 marks)

iii) THREE QUARTER FULL BOTTLE

SYMMETRICAL ≈ $y = 0.08$ TRENDLINE
0.09

(2 marks)

OR THE LIKE FOR THEIR DATA.

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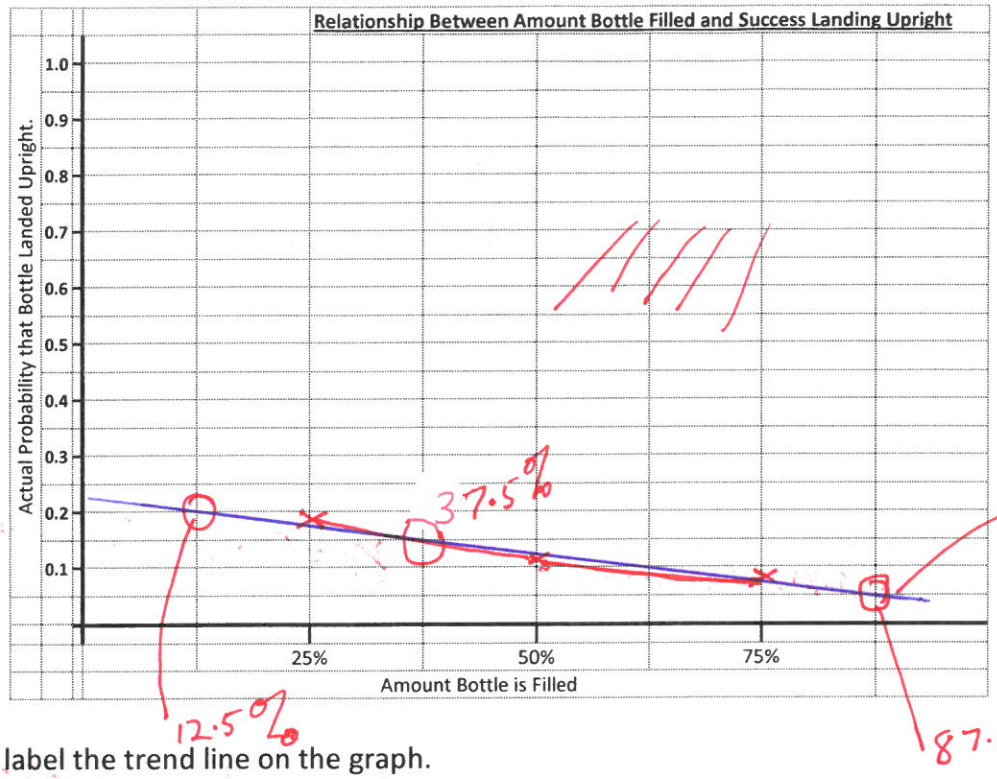
QUESTION TWO

a) Using the data contained in Table 1 Historical Data Summary, plot the performance of your bottle on the following graph. (Plot each value with an *x* and join up with a ruler).

(5 marks)



b) Sketch and label the trend line on the graph.

(2 marks)

c) Using the trend line in the graph, show on the graph and write below the predicted probability for a 37.5% filled bottle which is flipped to land upright.

(3 marks)

≈ 0.15 //

d) Is this an accurate estimate of the probability that a 37.5% filled bottle will land upright? Give your answer (YES/NO) and give reasons for your answer.

(3 marks)

Looks Quite Accurate So Yes

Dot Plot Very Close To Trend Line.

e) Could the estimate of the probability that a 37.5% filled bottle will land upright be made more accurate? Give your answer (YES/NO) and give reasons for your answer.

(3 marks)

No – It Is An Estmate. So

It "Looks" Like This Is A

Good Answer From The Trend Line.

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QUESTION THREE

If you were using the same bottle that you used at home and filled it 87.5% with water.

a) Using the trend line in the graph from QUESTION TWO, show on the graph and write below the predicted probability that this 87.5% filled bottle will land upright when it is flipped 10 times.

(4 marks)

ABOUT 0.05 //

b) In your own word explain why you think this the case.

(3 marks)

ESTIMATE ON TRENDLINE //

c) Similarly using the same bottle that you used at home, if you were to tip out some of the water so that it is $\frac{1}{8}$ full. Using the trend line in the graph from QUESTION TWO, show on the graph and write below the predicted probability that this 12.5% filled bottle will land upright when it is flipped 10 times.

(4 marks)

$\approx$ 0.2 //

d) In your own word explain why you think this the case.

(3 marks)

ESTIMATE ON TRENDLINE. //

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