

# Laboratory Activity 3 for Math 080: Topics from Chapter 1

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## 1 Introduction

Please watch the video entitled “Two-dimensional histograms” on Moodle, and repeat the calculation shown there, according to the parameters below. Perform your calculation in Excel or Calc. **The goal is to fill in the table below, using your results.**

## 2 Questions

1. Calculate the relative frequencies of the numbers of classes as done in the video.
2. Remove the final *overflow* column, as done in the video.
3. Create a 2D histogram from the relative frequencies that contains 5 rows and 3 columns. This is equivalent to filling in the following table:

(Years/Sizes)	0-19	20-39	40-99
2010-11	0.559	0.408	0.081
2012-13	0.561	0.402	0.086
2014-15	0.563	0.401	0.085
2016-17	0.605	0.369	0.083
2018-19	0.542	0.436	0.081

Rounding to nearest percentage :

(Year/Sizes)	0-19	20-39	40-99
2010-2011	56	41	3
2012-2013	57	40	3
2014-2015	56	41	3
2016-2017	61	37	2
2018-2019	54	43	2

4. Do you identify any trends? If so, what are they? (Base your arguments on the histogram you’ve constructed from the original data).—

© Whittier College, there's increased number of small class size (0-19) with a decreasing number of larger class sizes to maintain that per year. There's an upward trend as the years increased seen : the percentage of classes of 0-19 students has increased from 56 to 61 classes from 2010 to 2017.

Fall of	0-10	10-19	20-29	30-39	40-49	50-99	>100	N
2010	42	121	91	37	8	2	2	303
2011	51	154	117	22	6	2	1	353
2012	60	173	123	29	13	2	1	401
2013	51	168	137	31	5	1	2	395
2014	66	172	136	23	9	4	2	412
2015	76	148	154	21	4	4	1	408
2016	92	180	133	14	6	3	1	429
2017	66	157	141	12	8	2	1	387
2018	52	203	162	13	1	11	0	442
2019	43	152	165	18	4	2	0	384

Relative Version:

Fall of								
2010	0.13861386	0.39933993	0.30033003	0.12211221	0.02640264	0.00660066	0.00660066	303
2011	0.14447592	0.43626062	0.33144476	0.06232295	0.01699717	0.00566572	0.00283286	353
2012	0.14962594	0.43142145	0.30673317	0.0723192	0.03241895	0.00498753	0.00249377	401
2013	0.12911392	0.42531646	0.34683544	0.07848101	0.01265823	0.00253165	0.00506329	395
2014	0.16019417	0.41747573	0.33009709	0.05582524	0.02184466	0.00970874	0.00485437	412
2015	0.18627451	0.3627451	0.37745098	0.05147059	0.00980392	0.00980392	0.00245098	408
2016	0.21445221	0.41958042	0.31002331	0.03263403	0.01398601	0.00699301	0.002331	429
2017	0.17054264	0.40568475	0.36434109	0.03100775	0.02067183	0.00516796	0.00258398	387
2018	0.11764706	0.45927602	0.36651584	0.02941176	0.00226244	0.02488688	0	442
2019	0.11197917	0.39583333	0.4296875	0.046875	0.01041667	0.00520833	0	384

Without >100 column (less than 1 percent error).

Fall of								
2010	0.13861386	0.39933993	0.30033003	0.12211221	0.02640264	0.00660066		
2011	0.14447592	0.43626062	0.33144476	0.06232295	0.01699717	0.00566572		
2012	0.14962594	0.43142145	0.30673317	0.0723192	0.03241895	0.00498753		
2013	0.12911392	0.42531646	0.34683544	0.07848101	0.01265823	0.00253165		
2014	0.16019417	0.41747573	0.33009709	0.05582524	0.02184466	0.00970874		
2015	0.18627451	0.3627451	0.37745098	0.05147059	0.00980392	0.00980392		
2016	0.21445221	0.41958042	0.31002331	0.03263403	0.01398601	0.00699301		
2017	0.17054264	0.40568475	0.36434109	0.03100775	0.02067183	0.00516796		
2018	0.11764706	0.45927602	0.36651584	0.02941176	0.00226244	0.02488688		
2019	0.11197917	0.39583333	0.4296875	0.046875	0.01041667	0.00520833		

Relative, normalized histogram, with 2 x 2 binning

	Small (0-29)	Large (30-99)
Time A (2010-2014)	0.8894557	0.10617531
Time B (2015-2019)	0.93840678	0.06012002

	0-19	20-39	40-99
2010-2011	0.55934517	0.40810497	0.02783309
2012-2013	0.56773888	0.40218441	0.02629818
2014-2015	0.56334476	0.40742195	0.02558062
2016-2017	0.60513001	0.36900309	0.02340941
2018-2019	0.54236779	0.43624505	0.02138716

	0-19	20-39	40-99
2010-2011	56	41	3
2012-2013	57	40	3
2014-2015	56	41	3
2016-2017	61	37	2
2018-2019	54	43	2

Rounding to the nearest percent

	29 or fewer	30 or more
2010-2014	89	11
2015-2019	94	6

Time Series

Fall of	N
2010	303
2011	353
2012	401
2013	395
2014	412
2015	408
2016	429
2017	387
2018	442
2019	384

