Institutional Effectiveness, Research, & Planning

Math Success Center Data Report 2016-17

August 29, 2017

This report examines the relationship between visiting Cerritos College's Math Success Center (Math SC) and academic outcomes of students enrolled in a Math course during the 2016-17 school year. The report also compares academic outcomes between students who chose to visit the Math SC and those who did not visit.

EXECUTIVE SUMMARY

The students who visited Math SC were more likely to pass and complete Math courses than those who did not visit the Math SC. Similarly, students who visited the center more often were more likely to pass and complete their course than students who visited less often.

Details of the Data

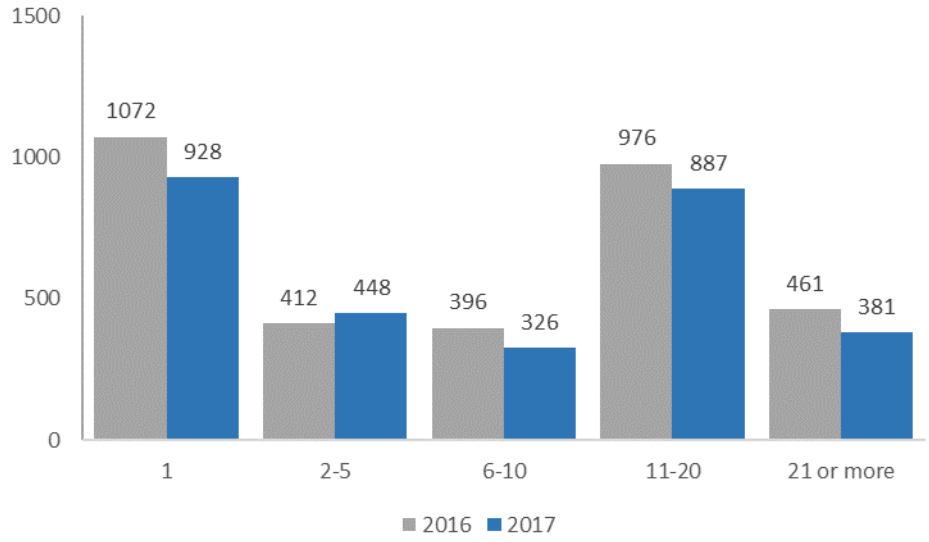
In total, 2,970 students visited the Math SC[1] during the 2016-17 school year; a slight decrease from the previous year total of 3,317 students, probably reflective of the decrease in overall enrollment in Math courses offered at Cerritos College. Of the 2,970 students who visited the success center for Math programming, 2,635 enrolled in a Math course during fall 2016 or spring 2017. Despite decrease in student headcount, the total number of visits increased about 2,000 from SY 2016 to SY 2017 (Table 1). Of the students that used the Math SC, most visited just once, or 11 to 20 times throughout the year (Figure 1). Eighty-nine percent of the students who enrolled in Math courses visited the Math SC at least once for Math-themed tutoring, directed learning activities (DLAs), or workshops.

Table 1. Frequencies for Math Success Center Student Visits

SY 2016				
	Minimum	Maximum	Sum	Mean
Visits	1	194	31257	10.19
Minutes	0	33975.47	3009183.60	981.47
Hours	0	566.26	50153.06	16.35
SY 2017				
	Minimum	Maximum	Sum	Mean
Visits	1	350	33579	12.74
Minutes	0	82200.13	5892534.00	2236.00
Hours	0	1370.08	98208.90	37.26

[1] Visits to the MATH SC include Math tutoring, directed learning activities, and workshops.

Figure 1. Counts of Math SC Student Visits



Math Enrollments by Course

Table 2 shows the number of enrollments in each Math Course by school year. In the 2017 school year, Math 60 had the highest number of enrollees who visited the Math SC (844) and the highest total number of enrollments (2,915).

Table 2. Math SC Enrollments by Math Course

	School Year			
	2016		2017	
Math Class	Math SC Enrollment	Total Enrollment	Math SC Enrollment	Total Enrollment
5	75	308	25	102
40	445	3149	221	1288
60	1386	6767	844	2915
70	165	603	90	266
75	63	301	84	220
80	1285	5220	722	2305
80A	332	1700	184	810
80B	355	1239	157	523
105	22	62	13	31
110A	34	135	16	56
110B	21	69	9	38
112	737	2508	512	1123
114	616	2146	256	857
115	5	43	4	13
116	194	551	110	236
140	452	1281	197	531
150	291	533	0	0
155	51	215	99	215
170	472	894	217	403
190	287	574	190	276

220	139	298	66	133
250	83	164	54	82
Total	7510	21250	4070	12423

*****_Students may be enrolled in multiple courses in the same term and throughout the school year._

Academic Achievement for Math SC Users and Non-Users

Table 3 shows indicators of academic achievement for Math SC users and non-users. On average, Math SC users had higher GPAs, earned more cumulative units, and enrolled in more units in the semester in which took their Math course.

Table 3. Comparison of Math SC Users and Non-Users Enrolled in a Math Course on Academic Achievement Indicators.

Academic Achievement	School Year							
	2016				2017			
	Math SC Users		Non-Users		Math SC Users		Non-Users	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Cumulative GPA	2.84	0.65	2.51	0.94	2.87	0.65	2.57	0.83
Cumulative Units	50.35	31.01	39.43	29.91	57.99	32.81	45.29	30.66
Units Taken	7.97	5.03	6.06	4.97	8.63	5.18	7.23	5.06

Demographic Data for Math SC Users and Non-Users

Tables 4 through 6 show demographic data for students who enrolled in an Math course during fall 2016 and spring 2017. The tables compare students who visited the Math Success Center to students who did not use the center. The groups have similar gender (Table 4), ethnic (Table 5), and age (Table 6) composition.

Table 4. Comparison of Math SC Users and Non-Users Enrolled in a Math Course by Gender

Gender	School Year							
	2016				2017			
	Math SC Users		Non-Users		Math SC Users		Non-Users	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Female	1619	53%	6644	53%	1404	53%	3390	53%
Male	1383	45%	5688	45%	1186	45%	2913	45%
Unknown	64	2%	210	2%	45	2%	117	2%
Total	3066	100%	12542	100%	2635	100%	6420	100%

Table 5. Comparison of Math SC Users and Non-Users Enrolled in a Math Course by Ethnicity

Ethnicity	School Year							
	2016				2017			
	Math SC		Non-Users		Math SC		Non-Users	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
African American/ Black	122	4%	300	2%	92	3%	122	2%
American Indian/ Alaskan Native	174	6%	654	5%	163	6%	320	5%
Asian	350	11%	1761	14%	383	15%	887	14%
Filipino	56	2%	165	1%	29	1%	79	1%
Hispanic/ Latino	2017	66%	8449	67%	1723	65%	4445	69%

Multiracial	5	0%	6	0%	1	0%	2	0%
Pacific Islander	22	1%	71	1%	10	0%	38	1%
White	102	3%	336	3%	60	2%	144	2%
Unknown	218	7%	800	6%	174	7%	383	6%
Total	3066	100%	12542	100%	2635	100%	6420	100%

Table 6. Comparison of Math SC Users and Non-Users Enrolled in a Math Course by Age Group

	School Year							
	2016				2017			
Age Group	Math SC Users		Non-Users		Math SC Users		Non-Users	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
19 or younger	746	24%	4487	36%	714	27%	2266	35%
20-24	1374	45%	5045	40%	1123	43%	2656	41%
25-29	472	15%	1674	13%	366	14%	856	13%
30-34	168	5%	669	5%	188	7%	317	5%
35-39	117	4%	303	2%	90	3%	152	2%
40-49	131	4%	267	2%	100	4%	128	2%
50 or older	58	2%	97	1%	54	2%	45	1%
Total	3066	100%	12542	100%	2635	100%	6420	100%

Completion and Success Rates by Math SC

Completion. Completion rate was defined as the percentage of students that earned a grade in the course (A, B, C, D, F, P, or NP) and did not withdraw. Math SC users had higher completion rates in most Math courses (Table 7). A chi-square test indicated that Math SC users were more likely to complete Math courses than students who did not visit the Math SC, χ^2 (1) = 82.29, p < .001. Further analysis showed that the risk of failure to complete increased by over 100 percent (RR = 1.34) for students who did not visit the learning center.

Table 7. Completion Rates by course for Math SC Users and Non-Users

	School Year							
	2016				2017			
Math Course	Math SC Users		Non-Users		Math SC Users		Non-Users	
	Total Enrolled	Rate	Total Enrolled	Rate	Total Enrolled	Rate	Total Enrolled	Rate
5	75	84%	233	70%	25	80%	77	70%
40	445	80%	2704	75%	221	80%	1066	73%
60	1386	74%	5381	70%	844	77%	2070	70%
70	165	85%	438	76%	90	80%	176	74%
75	63	89%	238	81%	84	88%	136	77%
80	1285	76%	3935	71%	722	77%	1583	69%
80A	332	82%	1368	77%	184	82%	626	74%
80B	355	81%	884	78%	157	83%	366	71%
105	22	86%	40	70%	13	92%	18	78%
110A	34	100%	101	95%	16	100%	40	93%
110B	21	81%	48	79%	9	67%	29	76%
112	737	79%	1771	74%	512	80%	611	70%

114	616	67%	1530	60%	256	69%	601	62%
115	5	60%	38	61%	4	50%	9	68%
116	194	81%	357	73%	110	76%	126	66%
140	452	76%	829	69%	197	73%	333	62%
150	291	80%	242	75%	0		0	
155	51	78%	164	66%	99	77%	116	62%
170	472	75%	422	69%	217	74%	186	69%
190	287	75%	287	64%	190	71%	86	49%
220	139	84%	159	73%	66	91%	67	78%
250	83	82%	81	64%	54	80%	28	61%
Total	7510	77%	21250	72%	4070	77%	8350	70%

Student Success. Success rate was defined as the percentage of students earning a grade of A, B, C, or P (passing). Failure was defined as a student earning a grade of W, D, F, FW, or NP (not passing). Table 8 compares success rates for Math SC users and non-users by course. A chi-square test indicated that Math SC users had higher overall rates of student success than non-users, χ^2 (1) = 115.58, $p < .001$. We calculated the Relative Risk to assess the size of the relationship between visiting the Math SC and student success. This analysis showed that the risk of failure increased by more than 20 percent (RR = 1.23) for students who did not visit the learning center.

Table 8. Comparison of Success Rates for Math SC Users and Non-Users by Math Course

Math Course	School Year							
	2016				2017			
	Math SC Users		Non-Users		Math SC Users		Non-Users	
	Total Enrolled	Rate	Total Enrolled	Rate	Total Enrolled	Rate	Total Enrolled	Rate
5	75	75%	233	57%	25	56%	77	58%
40	445	63%	2704	50%	221	56%	1066	49%
60	1386	48%	5381	42%	844	49%	2070	41%
70	165	65%	438	59%	90	58%	176	57%
75	63	48%	238	49%	84	49%	136	43%
80	1285	49%	3935	46%	722	54%	1583	42%
80A	332	67%	1368	57%	184	61%	626	56%
80B	355	63%	884	41%	157	68%	366	54%
105	22	77%	40	58%	13	85%	18	72%
110A	34	94%	101	86%	16	75%	40	83%
110B	21	57%	48	69%	9	56%	29	59%
112	737	61%	1771	56%	512	61%	611	48%
114	616	47%	1530	40%	256	50%	601	41%
115	5	40%	38	47%	4	25%	9	56%
116	194	64%	357	59%	110	63%	126	51%
140	452	60%	829	48%	197	59%	333	46%
150	291	69%	242	64%	0		0	
155	51	51%	164	48%	99	62%	116	38%
170	472	52%	422	48%	217	54%	186	50%
190	287	65%	287	48%	190	55%	86	33%

220	139	68%	159	48%	66	80%	67	61%
250	83	63%	81	46%	54	56%	28	32%
Total	7510	56%	21250	49%	4070	56%	8350	46%

Frequency of Math SC Visits and Course Outcomes

Math SC users were categorized according to their total number of visits during the 2016-17 school year. The categories were minimal user (1 visit), casual user (2-5 visits), moderate user (6-10 visits), frequent user (11-20 visits) and extreme user (21 and more visits). The final two columns of Table 9 show the success and completion rates for each user type. The columns show increases in success and completion rates as the frequency of visits increases.

Table 9. Math SC User Profile Data

School Year	User Type	Math SC Students		Visits			Outcome Rates	
		Number	Percent of Total	Range	Average Number	Average Time	Completion	Success
2016	Minimal	822	27%	1	1.00	0.98	84%	61%
	Casual	1003	33%	2-5	3.08	3.87	87%	65%
	Moderate	445	15%	6-10	7.77	10.07	89%	69%
	Frequent	388	13%	11-20	14.71	21.55	92%	73%
	Extreme	408	13%	21 or more	44.56	7.87	99%	85%
	Total	3066	100%		10.19	16.35	89%	68%
2017	Minimal	698	27%	1	1.00	6.70	77%	53%
	Casual	828	31%	2-5	3.09	2.17	82%	57%
	Moderate	353	13%	6-10	7.67	3.55	86%	63%
	Frequent	316	12%	11-20	14.85	1.82	86%	68%
	Extreme	440	17%	21 or more	52.10	12.57	92%	74%
	Total	2635	100%		15.74	13.27	83%	61%

Directed Learning Activities

In SY 2017, the success center hosted 468 Directed Learning Activity Visits for 165 unduplicated students. The number of visits decreased (number of visits = 1179; number of unduplicated students = 391) from the previous school year. However, this decrease was due to couple of students in SY 2016 attending every DLA session offered multiple times within the same day. Figure 2 shows that most students visited the success center for Directed Learning Activities between 11 and 20 times. Table 10 displays the count of DLA visits by type.

Figure 2. Counts of Math SC Directed Learning Activity Visits

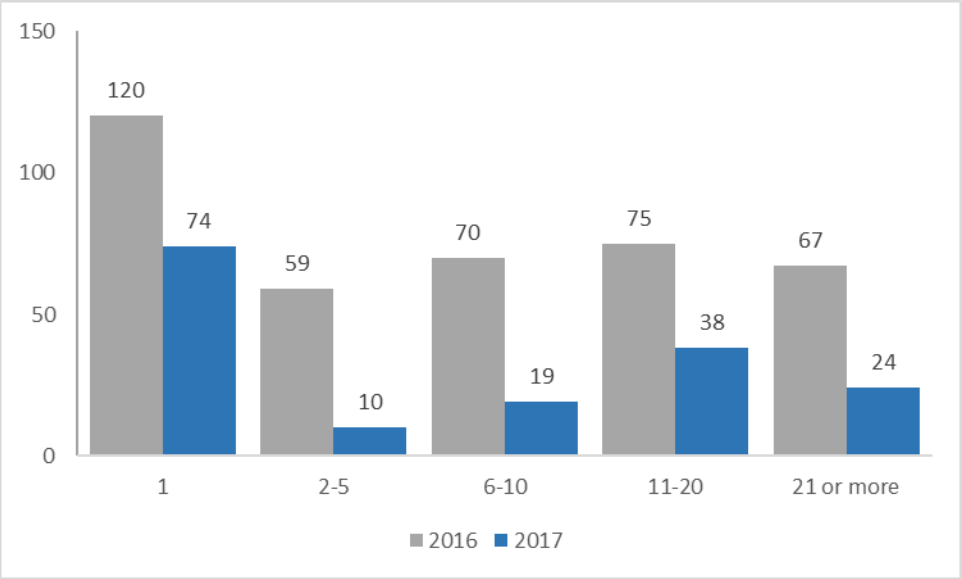


Table 10. Count of DLA visits by type

DLA Name	School Year	
	2016	2017
M001.1 - Equivalent Fractions	26	3
M002.1 - Order of Operations	23	6
M003.1 - Unit Conversion	6	3
M004.1 - Adding and Subtracting Integers	36	3
M005.1 - Order of Operations - Scientific Calculations	7	3
M006.1 - Solving Basic Linear Equations Using Chips	13	4
M007.1 - Adding and Subtracting Fractions-Fraction Tiles	12	8
M008.1 - Applying The Concepts of Percent	8	2
M009.1 - Proportional Reasoning	3	7
M010.1 - Adding and Subtracting Whole Numbers	13	1
M011.1 - Multiplying and Dividing Whole Numbers	7	3
M012.1 - Adding and Subtracting Decimals	7	7
M013.1 - Multiplying and Dividing Decimals	9	2
M014.1 - After-Exam Debriefing	212	3
M101.1 - Linear Model Applications	33	13
M102.1 - Scientific Notation	57	23
M103.1 - Word Problems (Investments)	55	12
M104.1 - Word Problems (Mixtures)	52	17
M105.1 - Word Problems (Coin)	34	3
M106.1 - Word Problems (Translation)	33	7
M107.1 - Word Problems: Uniform Motion	13	4
M108.1 - Solving Linear Equations	66	35
M109.1 - Quadratic Formula	74	49
M110.1 - Translating Algebraic Expressions	32	8
M111.1 - Transformations Using Parent Graphs	25	2
M112.1 - Factoring Up to Four Terms	58	41
M113.1 - Factoring: 3-Terms (ac Method)	33	34
M114.1 - Factoring: Two Terms	110	55

M115.1 - Factoring: 3-Terms (a=1)	36	31
M116.1 - Factoring: 3-Terms (does not equal 1)	26	6
M401.1 - Pythagorean Theorem	14	8
M402.1 - Simplifying Using Trigonometric Identities	1	0
M403.1 - Graphing Sine and Cosine Functions (Part One)	1	0
M404.1 - Graphing Sine And Cosine Functions (Part Two)	0	2
M601.1 - Pharmacology Calculations	44	57
M602.1 - Reading a Food Label	0	5
M603.1 - Unit Conversion: Volume Areas	0	1
Total	1179	468

Demographic Data for DLA Users and Non-Users

Tables 11 through 13 show demographic data for students who enrolled in a Math course during fall 2016 and spring 2017. The tables compare students who attended a DLA to students who did not attend. The groups have similar gender (Table 11), ethnic (Table 12), and age (Table 13) composition.

Table 11. Comparison of DLA Users and Non-Users enrolled in a Math course by gender

	School Year							
Gender	2016				2017			
	DLA User		Non-User		DLA User		Non-User	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Female	201	56%	8062	53%	84	69%	4710	53%
Male	147	41%	6924	45%	35	29%	4064	46%
Unknown	10	3%	264	2%	2	2%	160	2%
Total	358	100%	15250	100%	121	100%	8934	100%

Table 12. Comparison of DLA Users and Non-Users enrolled in a Math course by ethnicity

	School Year							
Ethnicity	2016				2017			
	DLA User		Non-User		DLA User		Non-User	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
African American/ Black	15	4%	407	3%	5	4%	209	2%
American Indian/ Alaskan Native	12	3%	816	5%	8	7%	475	5%
Asian	37	10%	2074	14%	17	14%	1253	14%
Filipino	8	2%	213	1%	1	1%	107	1%
Hispanic/ Latino	244	68%	10222	67%	82	68%	6086	68%
Multiracial	1	0%	10	0%	0	0%	3	0%
Pacific Islander	1	0%	92	1%	0	0%	48	1%
Unknown	25	7%	993	7%	5	4%	552	6%
White	15	4%	423	3%	3	2%	201	2%
Total	358	100%	15250	100%	121	100%	8934	100%

Table 13. Comparison of DLA Users and Non-Users enrolled in a Math course by age

Age Group	School Year							
	2016				2017			
	DLA Users		Non-Users		DLA Users		Non-Users	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
19 or younger	83	23%	5150	34%	48	40%	2932	33%
20-24	153	43%	6266	41%	39	32%	3740	42%
25-29	57	16%	2089	14%	16	13%	1206	14%
30-34	24	7%	813	5%	8	7%	497	6%
35-39	12	3%	408	3%	2	2%	240	3%
40-49	15	4%	383	3%	4	3%	224	3%
50 or older	14	4%	141	1%	4	3%	95	1%
Total	358	100%	15250	100%	121	100%	8934	100%

Academic Outcomes by DLA Use

Table 14 shows indicators of academic achievement for DLA users and non-users. During SY 2017, DLA users had higher GPAs and enrolled in more units in the semester in which took their Math course, but students who did not use DLA tended to earn about 0.25 more cumulative units than DLA users.

Table 14. Comparison of DLA Users and Non-Users Enrolled in a Math Course on Academic Achievement Indicators.

Academic Achievement	School Year							
	2016				2017			
	DLA Users		Non-Users		DLA Users		Non-Users	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Cumulative GPA	2.93	0.59	2.57	0.90	2.70	0.61	2.66	0.80
Cumulative Units	50.20	27.51	41.59	30.53	48.74	28.00	48.99	31.87
Units Taken	7.80	4.89	6.44	5.04	9.41	4.89	7.61	5.13

Completion and Success Rates by DLA Use

Completion. Completion rate was defined as the percentage of students that earned a grade in the course (A, B, C, D, F, P, or NP) and did not withdraw. DLA users had higher completion rates in most Math courses (Table 15). A chi-square test indicated that DLA users were more likely to complete Math courses than students who did not visit the DLA, χ^2 (1) = 32.34, p < .001. Further analysis showed that the risk of failure to complete doubled (RR = 2.47) for students who did not visit the learning center.

Table 16. Completion Rates by course for DLA Users and Non-Users

Math Course	School Year							
	2016				2017			
	DLA Users		Non-Users		DLA Users		Non-Users	
	Total Enrolled	Rate	Total Enrolled	Rate	Total Enrolled	Rate	Total Enrolled	Rate
5	25	80%	283	73%	1	0%	101	73%
40	80	88%	3063	75%	7	71%	1275	74%

60	203	81%	6562	71%	103	96%	2811	71%
70	19	79%	582	78%	6	50%	260	77%
75	4	100%	294	82%	4	75%	213	81%
80	190	85%	5029	72%	83	93%	2222	71%
80A	35	83%	1665	77%	2	50%	808	76%
80B	56	88%	1183	78%	4	75%	519	75%
105	0		62	76%			31	84%
110A	2	100%	133	96%	2	100%	54	94%
110B	0		69	80%			38	74%
112	60	77%	2448	75%	10	70%	1113	75%
114	27	56%	2119	62%	5	60%	852	64%
115	0		43	61%			13	54%
116	5	80%	546	76%	3	100%	233	71%
140	68	85%	1212	71%	5	40%	525	69%
150	99	80%	434	77%				
155	3	100%	212	68%	1	100%	214	69%
170	80	69%	814	72%	1	100%	402	71%
190	31	71%	542	70%			276	64%
220	6	100%	292	77%			133	84%
250	3	100%	161	73%			82	73%
Total	996	81%	27748	73%	237	89%	12175	72%

Student Success. Success rate was defined as the percentage of students earning a grade of A, B, C, or P (passing). Failure was defined as a student earning a grade of W, D, F, FW, or NP (not passing). Table 16 compares success rates for students who attended a DLA and non-users by course. A chi-square test indicated that students who attended a DLA had higher overall rates of student success than non-users, χ^2 (1) = 8.93, $p < .001$. We calculated the Relative Risk to assess the size of the relationship between attending a DLA and student success. This analysis showed that the risk of failure increased by 20 percent (RR = 1.23) for students who did not use DLAs.

Table 16. Comparison of Success Rates for DLA Users and Non-Users by Math Course

Math Course	School Year							
	2016				2017			
	DLA Users		Non-Users		DLA Users		Non-Users	
	Total Enrolled	Rate	Total Enrolled	Rate	Total Enrolled	Rate	Total Enrolled	Rate
5	25	80%	283	60%	1	0%	101	58%
40	80	69%	3063	52%	7	43%	1275	50%
60	203	57%	6562	43%	103	68%	2811	42%
70	19	58%	582	60%	6	33%	260	58%
75	4	75%	294	48%	4	50%	213	45%
80	190	58%	5029	47%	83	60%	2222	45%
80A	35	74%	1665	59%	2	50%	808	57%
80B	56	63%	1183	60%	4	25%	519	58%
105			62	65%			31	77%
110A	2	100%	133	88%	2	0%	54	83%

110B			69	65%			38	58%
112	60	58%	2448	57%	10	40%	1113	54%
114	27	41%	2119	42%	5	60%	852	44%
115			43	51%			13	46%
116	5	80%	546	61%	3	67%	233	56%
140	68	79%	1212	51%	5	0%	525	51%
150	99	61%	434	68%				
155	3	100%	212	48%	1	100%	214	49%
170	80	45%	814	50%	1	0%	402	52%
190	31	58%	542	56%			276	48%
220	6	100%	292	56%			133	71%
250	3	100%	161	53%			82	48%
Total	996	61%	27748	50%	237	59%	12175	49%