## Bakersfield College HISTORY of Multiple Measures in Math

- **The majority of students who do enter the basic skills math sequence do not persist:** Over a three-year period (20010-13), only 48% of the students in Modern College Arithmetic and Pre-algebra enrolled in the next level, beginning algebra; 33% of students in beginning algebra enrolled in the next level, intermediate algebra.

- **Very few students make it to college-level math:** Less than 19% of the students who begin college in Modern College Arithmetic and Pre-algebra (3 levels below transfer) will make it through the math sequence (2008-2011). Only 12% will make it to a college-level math class.

- **The longer students spend in remediation, the less likely they are to finish the sequence and continue into college-level work.** In Math, of those placed in the highest level basic skills course, 33% will finish; at mid-level, only 12% will finish. Only 4% of those placed in the lowest level of basic skills math will finish the sequence.

Figure 1: College Preparation Status of Entering BC Freshman 2012-2013 cohort

■ Prepared
■ Under-prepared

16%
84%
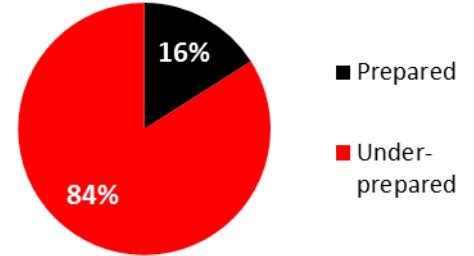
Background:

1. Underprepared students at BC represent a growing percentage of first-time students (84% in 2013-14)[1].

2. National research indicates that placement testing may result in a 25% (or higher) misplacement of students – predominantly placing students too low. (Please see the references on page 14.)

3. Title 5 regulations require the use of multiple measures at the time of placement.

4. Research at Long Beach City College (LBCC STEPS study) and a follow-up study including 11 colleges which included BC indicate use of high school transcripts are more predictive for course success than placement scores.

5. Incorrect placement of students may be associated with the inability to thrive and succeed in the transition to college and beyond. BC success rates[2] are vastly different for underprepared versus prepared students; Underprepared student success was 34.8% in 2012-13 whereas prepared student success was 68%. Identification of prepared versus underprepared students is based upon enrollment in a remedial course. The longer the remedial pathway the less likely students will reach a higher level outcome.

6. BC created numerous new remediation pathways in Academic Development, English and Math to accelerate or compress the curriculum to get students to college level more quickly.

7. In a pilot implementation project for BC multiple measures, the college collaborated with CalPASS, the CCCCO, and CSUB's CalSOAP[3] project to create a cohort of over 500 students in a project called Transfer Making it Happen (TMIH). The project included discipline faculty from Academic Development, English and Math collaborating with BC and CSUB counseling faculty to review high school transcripts and place first-time students into English and Math coursework based upon defined multiple measures.

8. A workgroup created abbreviated Student Education Plans (aSEP), which included any necessary math, English and reading pre-collegiate courses in the first semester, for each of the 454 students with complete information available, based upon BC Achieving the Dream[4] data that indicated students:

    a. completing Math and English in their first semester are more likely to succeed and

    b. students completing a Student Ed Plan (SEP) are more likely to succeed.

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[1] CCCCO Scorecard Prepared/Underprepared status determined by student registration in remedial courses.
[2] Scorecard success outcomes are defined as the success in completing a certificate, degree, transfer or transfer-ready status
[3] CalSOAP: The California Student Opportunity and Access Program (Cal-SOAP) was established by the state legislature in 1978.
[4] Achieving the Dream data analyze the success rates of students based upon locally defined variables. See Appendix GI for a definition of all data sources.

Pathways in Developmental Math and English at Bakersfield College:
Historical Analysis of Student Course-Taking Behavior, 2000 to 2013

By Peter Riley Bahr Center for the Study of Higher and Postsecondary Education, University of Michigan, Revised August 7, 2015
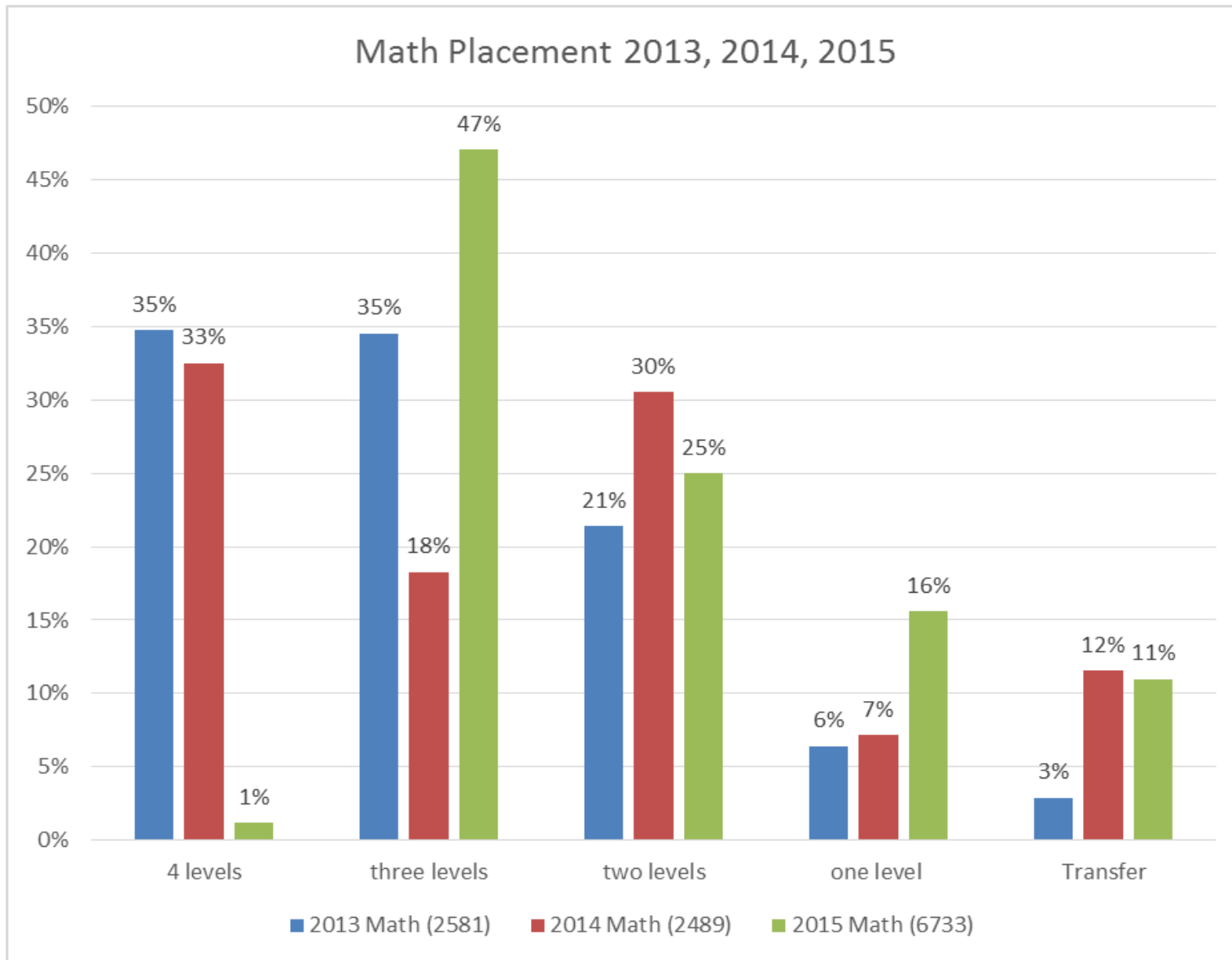
Figure 1: Progress of first-time students in development mathematics at Bakersfield College[7]
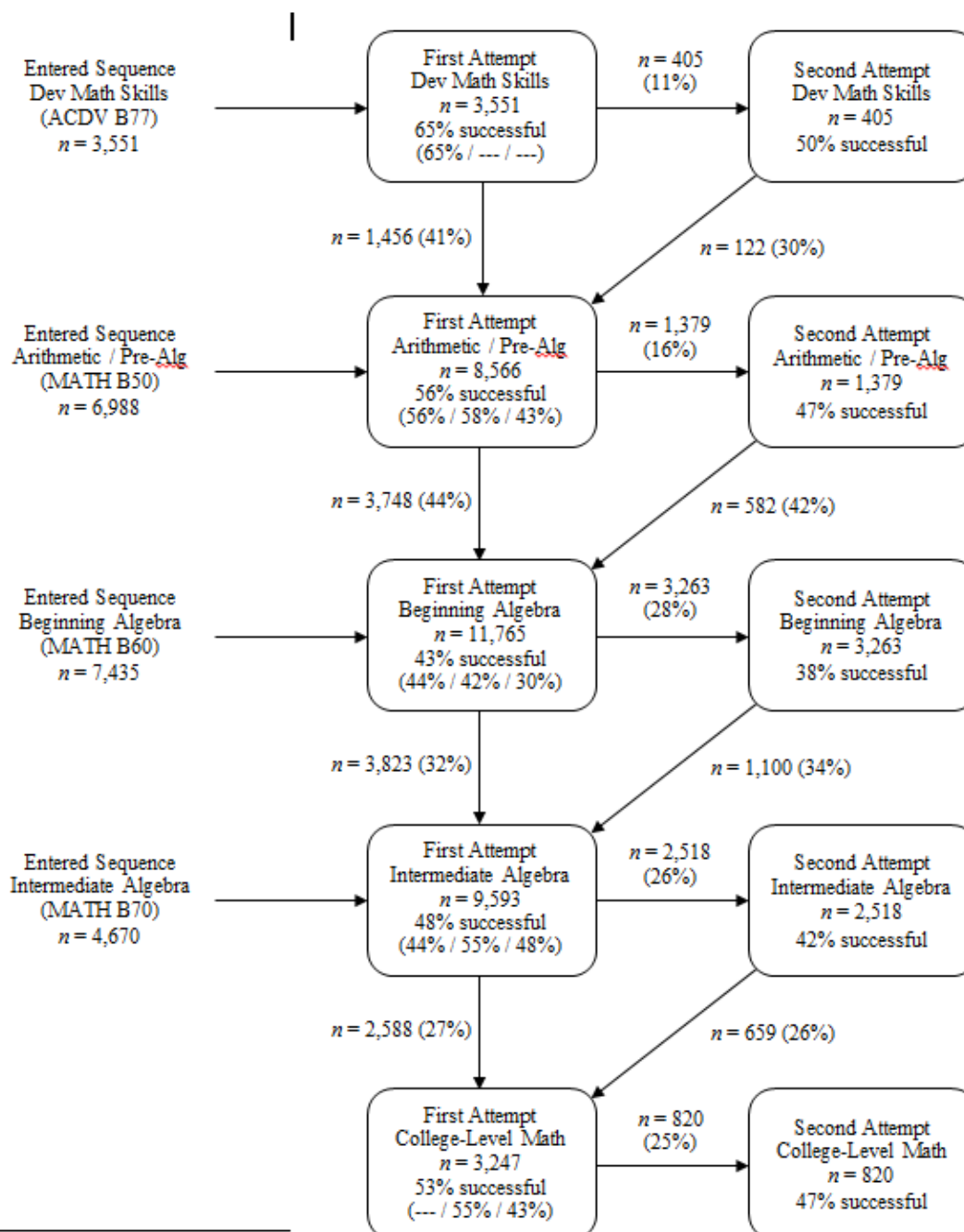
[7] Parenthetical percentages are success rates by how students arrived in a course, whether entering it as their first math course (the first percentage), advancing to the course after attempting the prior course only once (the second percentage), or advancing to the course after attempting the prior course two or more times (the third percentage).

Basic Skills Progress Tracker Report

	Fall 2012-Spring 2015	Fall 2012-Spring 2015	Fall 2012-Spring 2015	Fall 2012-Spring 2015	Fall 2012-Spring 2015	Fall 2012-Spring 2015	Fall 2012-Spring 2015	Fall 2012-Spring 2015	Fall 2012-Spring 2015
	Three Levels Below Transfer	Three Levels Below Transfer	Three Levels Below Transfer	Two Levels Below Transfer	Two Levels Below Transfer	Two Levels Below Transfer	One Level Below Transfer	One Level Below Transfer	One Level Below Transfer
	Pre-Algebra	Pre-Algebra	Pre-Algebra	Algebra	Algebra	Algebra	Intermediate Algebra	Intermediate Algebra	Intermediate Algebra
	Students	Attempts	Success	Students	Attempts	Success	Students	Attempts	Success
Bakersfield Total	412	487	288	231	300	139	109	129	61
Mathematics Total	412	487	288	231	300	139	109	129	61
African-American	19	27	9	8	11	5	2	2	0
American Indian/Alaskan Native	4	4	3	2	3	0			
Asian	20	23	19	17	23	11	7	8	4
Hispanic	274	324	191	153	195	94	77	93	43
Multi-Ethnicity	12	12	9	8	12	4	3	3	1
Pacific Islander	2	2	1	1	1	1	1	1	1
Unknown	1	1	1						
White Non-Hispanic	80	94	55	42	55	24	19	22	12

Math Placement 2013, 2014, 2015

Level	2013 Math (2581)	2014 Math (2489)	2015 Math (6733)
4 levels	35%	33%	1%
three levels	35%	18%	47%
two levels	21%	30%	25%
one level	6%	7%	16%
Transfer	3%	12%	11%

MIH Group	Math (college-wide)	English (college-wide)	Reading (college-wide)	Total students enrolled from each cohort
2011	64% (50.5%)	57% (58.7%)	62% (67.8%)	73
2012	59% (52.7%)	64% (61.7%)	75% (67.1%)	92
2013	64% (53.9%)	61% (62.2%)	59% (67.3%)	99
2014	49% (52.2%)	60% (63.1%)	62% (65.9%)	326
2015 Summer only	71% N=83	59.5% N=37	80% (N=24)	1635

Multiple Measures Success Fall 2014 in Remedial Math MIH Cohort
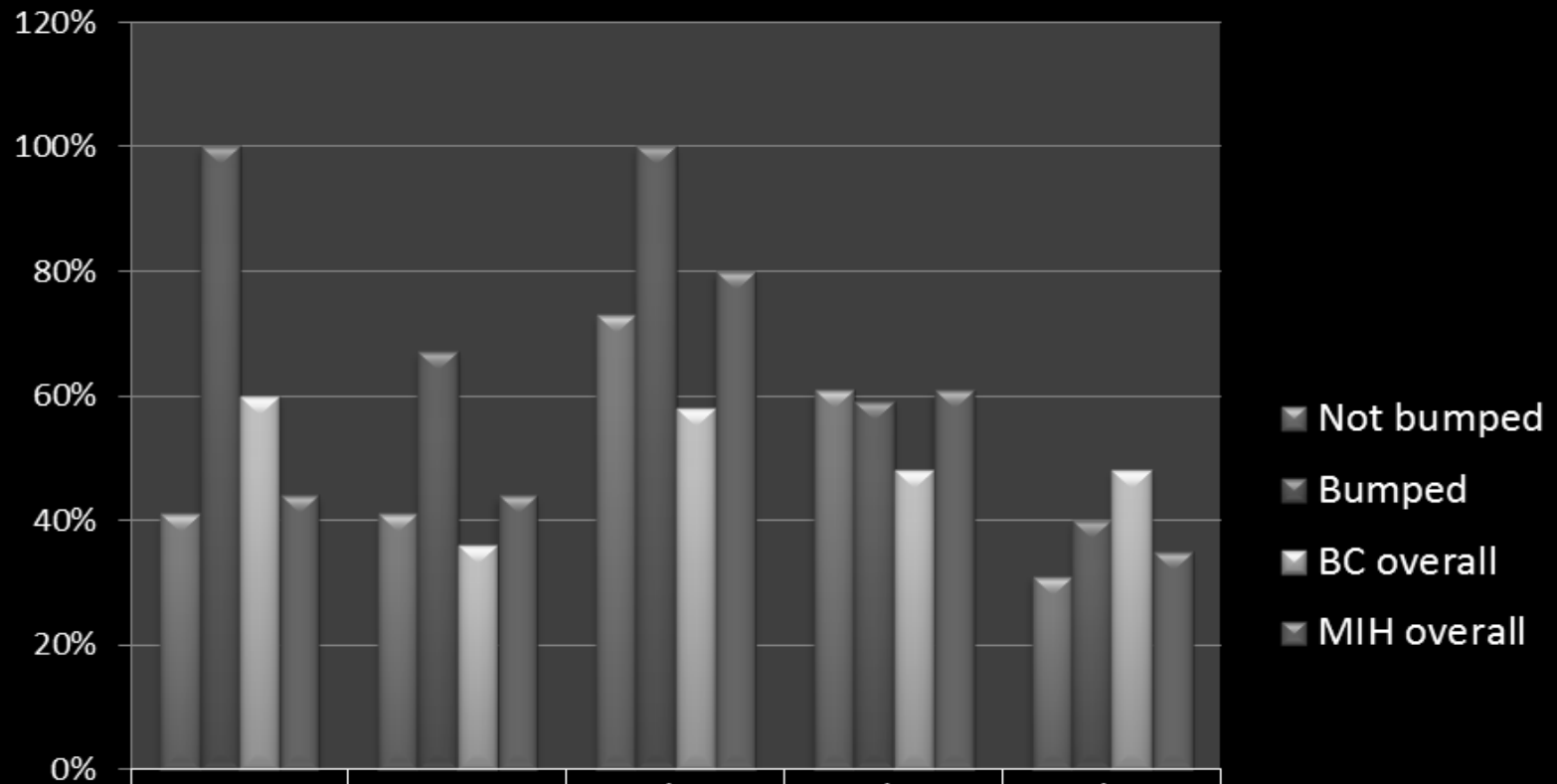
	ACDV B77	ACDV B72	Math B50	Math B60	Math B70
Not bumped	41%	41%	73%	61%	31%
Bumped	100%	67%	100%	59%	40%
BC overall	60%	36%	58%	48%	48%
MIH overall	44%	44%	80%	61%	35%

BC Math Placement Agreement for AP Students

Please read, and then fill out and submit this form to the Math Department Chair for a signature. Once your form has been submitted, the Math Department Chair will notify counseling to do an override to let you enroll in the appropriate calculus course.

Student Name: _____

Student ID Number:_____

Contact Number: _____

Please circle the AP Exam you will be taking: AP Exam AB   AP Exam BC

BC Math Placement Agreement for AP Students

If you are a high school student who plans on taking the AP Exam AB, you will be allowed to register for Math B6B (Calculus II). If you plan on taking the AP Exam BC, you will be allowed to register for Math B6C (Calculus III). This will be done with the understanding that you must earn an AP score of 3, 4 or 5. We should receive your AP score from your high school sometime during the first two weeks of July. A student who earns an AP score lower than 3, or who does not take the AP exam will be dropped from the calculus class before the new semester begins.

Caution: *Certain universities, such as Cal Poly SLO, limit the amount of AP credit they will allow. This can have a negative impact on BC students transferring these AP credits to their new 4-year institution. Because of this, the BC Math Department recommends that AP students do not take any calculus course higher than Math B6B (Calculus II) as their first BC math course to avoid this situation.*

 I have read the above agreement and caution. I understand I will be dropped from my calculus class if I do not earn an AP score of 3 or higher, or if I fail to take the AP Exam.

Student Signature: _____ Date: _____

Math Department Chair Signature: _____

Regina Hukill
BC Math Department Chair
1801 Panorama Dr.
Bakersfield, CA 93305
Office: MS 107E, Phone: 661.395.4331

Pilot Multiple Measures for Math (Junior Year)
These Multiple Measure Rules are based on Cumulative Junior GPA and the grade of the highest math class <u>completed</u> as of their Junior Year. The Multiple Measure rules should be used disjunctively with the assessment test. That means that a student's placement should be

based on an analysis of both the assessment and the multiple measures, and then the student should be placed based on the higher of the two.

Place as assessed unless:

Level	Complete Data Through Junior Year
➢ Transfer Level ➢ BC Placement Code Level 05 ➢ Student can take Math B1B or Math B2	• Cum Jr GPA ≥2.9 AND Math Analysis Grade is B or better
➢ Transfer Level ➢ BC Placement Code Level 04 ➢ Student can take Math B1A, Math B22, Math B4A, Math B23, or Psych B5	• Cum Jr GPA ≥2.9 AND Algebra II Grade is B or better
➢ 1 Level Prior to Transfer ➢ BC Placement Code Level 03 ➢ Student can take Math B70	• Cum Jr GPA ≥2.9 AND Geometry Grade is B or better • Cum Jr GPA ≥2.9 AND Algebra I Grade is B or better
➢ 2 Levels Prior to Transfer ➢ BC Placement Code Level 02 ➢ Student can take Math B60, or Math B65	• 2.5 ≤ Cum Jr GPA < 2.9
Note: Use test score to place if Cum Jr GPA < 2.5	

Pilot Multiple Measures for Math (Senior Year)
These Multiple Measure Rules are based on Cumulative Senior GPA and the grade of the highest math class <u>completed</u> as of their Senior Year. The Multiple Measure rules should be used disjunctively with the assessment test. That means that a student's placement should be based on an analysis of both the assessment and the multiple measures, and then the student should be placed based on the higher of the two.

<u>Place as assessed unless:</u>

Level	Complete Data Through Senior Year
➢ Transfer Level ➢ BC Placement Code Level 05 ➢ Student can take Math B1B or Math B2	• Cum Sr GPA ≥2.7 AND Math Analysis Grade is B or better • Cum Sr GPA ≥2.7 AND Calculus Grade is C or better
➢ Transfer Level ➢ BC Placement Code Level 04 ➢ Student can take Math B1A, Math B22, Math B4A, Math B23, or Psych B5	• Cum Sr GPA ≥2.7 AND Algebra II Grade is B or better • Cum Sr GPA ≥2.7 AND Math Analysis Grade is C or better • Cum Sr GPA ≥2.7 AND Statistics Grade is C or better
➢ 1 Level Prior to Transfer ➢ BC Placement Code Level 03 ➢ Student can take Math B70	• Cum Sr GPA ≥2.7 AND Geometry Grade is B or better • Cum Sr GPA ≥2.7 AND Algebra I Grade is B or better • Cum Sr GPA ≥2.7 AND Algebra II Grade is C or better
➢ 2 Levels Prior to Transfer ➢ BC Placement Code Level 02 ➢ Student can take Math B60, or Math B65	• 2.5 ≤ Cum Sr GPA < 2.7
Note: Use test score to place if Cum Sr GPA < 2.5	