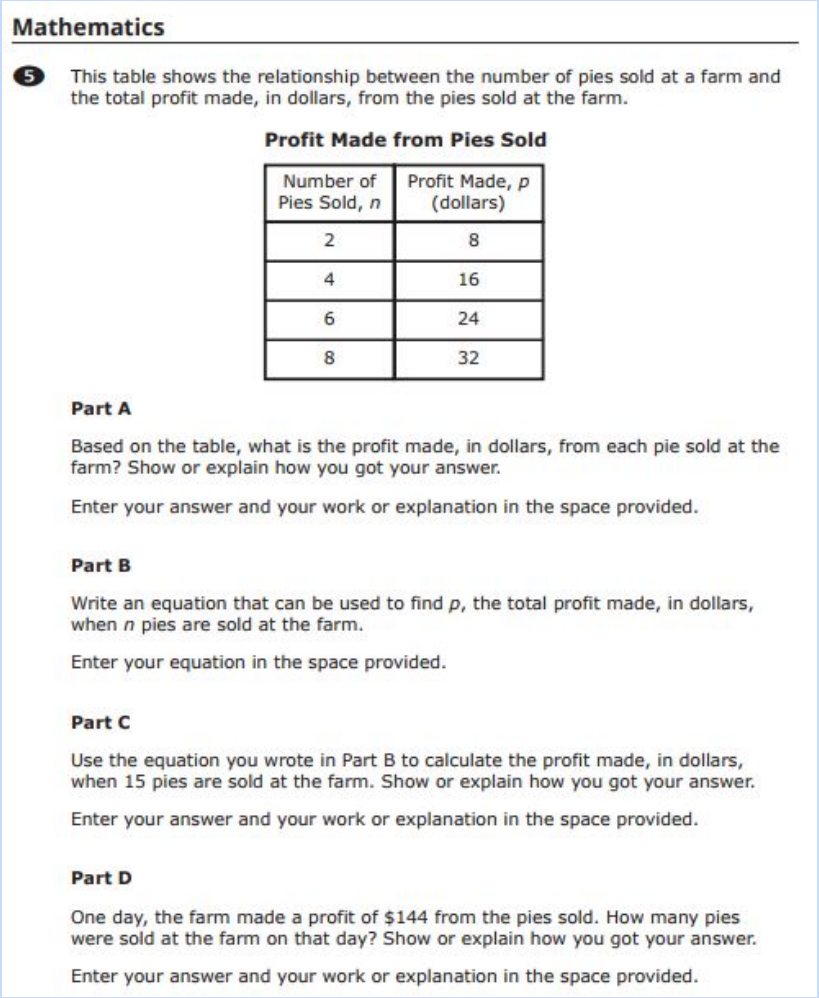
Bedford Math Department Update

November 21, 2017

Math Department Vision

- Standards based
- All students at all levels develop skills and conceptual understanding
- Productive struggle with rich tasks.
- Meaningful classroom opportunities that promote reasoning and problem solving



Mathematics

5 This table shows the relationship between the number of pies sold at a farm and the total profit made, in dollars, from the pies sold at the farm.

Profit Made from Pies Sold

Number of Pies Sold, n	Profit Made, p (dollars)
2	8
4	16
6	24
8	32

Part A

Based on the table, what is the profit made, in dollars, from each pie sold at the farm? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

Part B

Write an equation that can be used to find p, the total profit made, in dollars, when n pies are sold at the farm.

Enter your equation in the space provided.

Part C

Use the equation you wrote in Part B to calculate the profit made, in dollars, when 15 pies are sold at the farm. Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

Part D

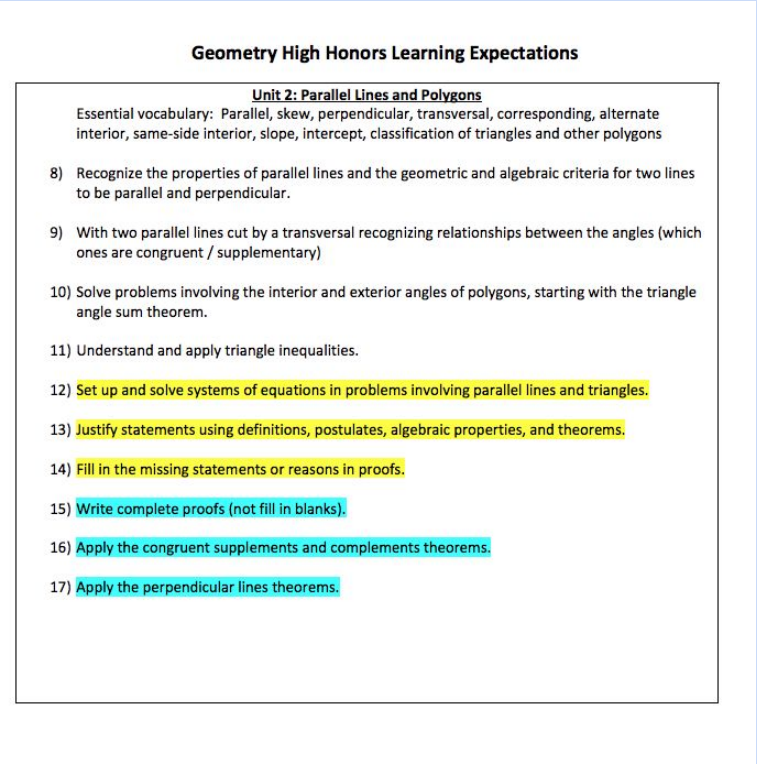
One day, the farm made a profit of $144 from the pies sold. How many pies were sold at the farm on that day? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

Accomplishments and Strengths

- Objective-based Learning Expectations
- Growing AP Calculus enrollment and strong scores
- Geometry High Honors enrollment growing
- Calculus Project Program
  [explained last month in detail]

Objective-based Learning Expectations



Geometry High Honors Learning Expectations

Unit 2: Parallel Lines and Polygons

Essential vocabulary: Parallel, skew, perpendicular, transversal, corresponding, alternate interior, same-side interior, slope, intercept, classification of triangles and other polygons

8) Recognize the properties of parallel lines and the geometric and algebraic criteria for two lines to be parallel and perpendicular.

9) With two parallel lines cut by a transversal recognizing relationships between the angles (which ones are congruent / supplementary)

10) Solve problems involving the interior and exterior angles of polygons, starting with the triangle angle sum theorem.

11) Understand and apply triangle inequalities.

12) Set up and solve systems of equations in problems involving parallel lines and triangles.

13) Justify statements using definitions, postulates, algebraic properties, and theorems.

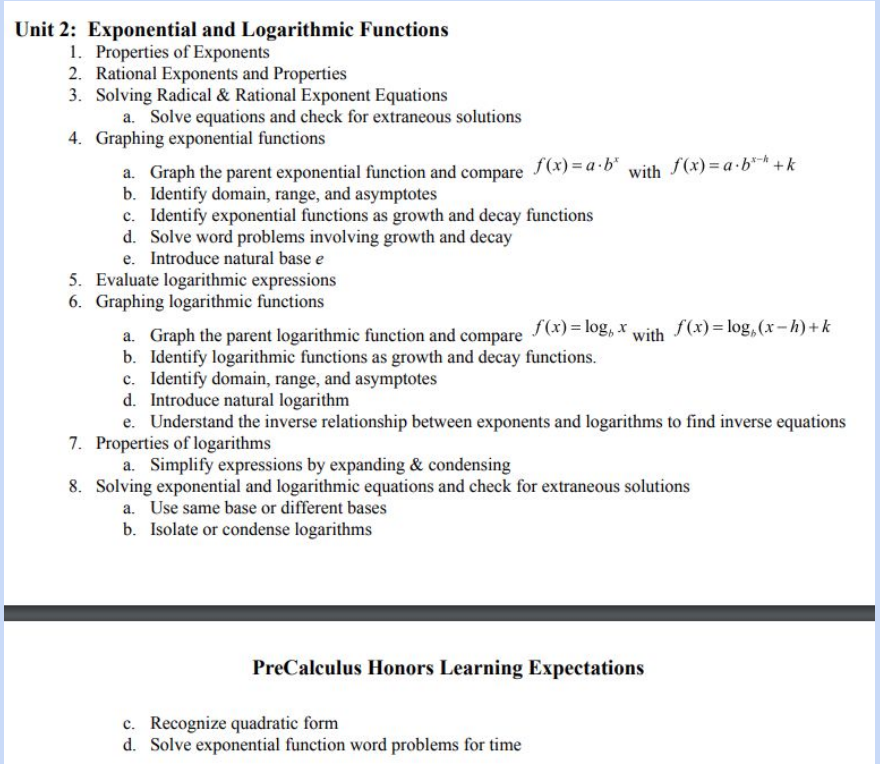
14) Fill in the missing statements or reasons in proofs.

15) Write complete proofs (not fill in blanks).

16) Apply the congruent supplements and complements theorems.

17) Apply the perpendicular lines theorems.

Geometry College Prep, Honors, High Honors



Unit 2: Exponential and Logarithmic Functions

1. Properties of Exponents
2. Rational Exponents and Properties
3. Solving Radical & Rational Exponent Equations
   a. Solve equations and check for extraneous solutions
4. Graphing exponential functions
   a. Graph the parent exponential function and compare $f(x) = a \cdot b^x$ with $f(x) = a \cdot b^{x-h} + k$
   b. Identify domain, range, and asymptotes
   c. Identify exponential functions as growth and decay functions
   d. Solve word problems involving growth and decay
   e. Introduce natural base e
5. Evaluate logarithmic expressions
6. Graphing logarithmic functions
   a. Graph the parent logarithmic function and compare $f(x) = \log_b x$ with $f(x) = \log_b(x-h) + k$
   b. Identify logarithmic functions as growth and decay functions.
   c. Identify domain, range, and asymptotes
   d. Introduce natural logarithm
   e. Understand the inverse relationship between exponents and logarithms to find inverse equations
7. Properties of logarithms
   a. Simplify expressions by expanding & condensing
8. Solving exponential and logarithmic equations and check for extraneous solutions
   a. Use same base or different bases
   b. Isolate or condense logarithms

PreCalculus Honors Learning Expectations

c. Recognize quadratic form
d. Solve exponential function word problems for time

Pre-Calculus Honors

AP Calculus producing strong results

	BC Calculus								AB Calculus							
Year	**#**	**Avg**	**≥ 3**	**5**	**4**	**3**	**2**	**1**	**#**	**Avg**	**≥ 3**	**5**	**4**	**3**	**2**	**1**
2018	16								33							
2017	28	4.64	100%	21	4	3			31	3.81	90%	9	11	8	2	1
2016	16	4.69	94%	14		1	1		24	4.67	100%	17	6	1		
2015	14	5.00	100%	14					33	4.18	97%	12	16	4	1	
2014	18	4.78	100%	15	2	1										
2013	11	4.73	100%	9	1	1										
2012	12	5.58	100%	8	3	1										
2011	16	4.56	100%	12	2	1										
2010	10	5	100%	10												

Geometry High Honors enrollment growing

- YOG 2020: 47 students [22.4%]
- YOG 2021: 33 students [17%]
- YOG 2022: 70-80 students projected from JGMS.

From YOG 2015-2019 [5 years] Geometry HH averaged 29 students with a range of 19 to 40 total students.

Challenges and Action Steps

- Geometry High Honors
- Tutoring for Pay
- MCAS: Dip or a Trend?

Geometry High Honors

Year	# Students	Final Average
YOG 2018 (Current Seniors)	40	79.7%
YOG 2019	26	85%
YOG 2020	47	83%

Geometry High Honors

- Our course audit looked to make the course more accessible to students in Algebra I at JGMS.
- Have high expectations and work with students to meet them.
- Set the bar at a level where students like the quote below would have success in Geometry HH at BHS.

….definitely on the cusp for me. She was a solid algebra student, but didn't seem excited about the challenge that Geometry HH would bring. I wouldn't be surprised if she ended up in high honors before the end of high school though [8th Grade Teacher].

Tutoring for Pay

- Kids seeing tutors is not unique to Bedford.
- One local school's pay tutoring list had 40+ names. By comparison our list has 6 names.
- Our message to families is the teacher should be the first place to turn for help.

Academic Support

Concord-Carlisle	Teachers have 4 classes and math teachers are available during school day in the Math Resource Center for drop in help. Students can go for assigned math tutorial as well, including those in Special Education. CCHS' testing center is another place for all students to make up assessments.
Brookline	Math Center staffed by 5 teachers before school for 45 minutes. Teachers teach 4 classes and have 1 extra non "prep."
Newton South	Math Center with by volunteers and student tutors. Drop in help during day and 2 days after school.
Acton	Academic support center during the day.
Bedford	**Math Center staffed by one 0.5 Title I Interventionist & 1.0 TA - Supported by 0.8 Academic Achievement Center Teacher.**

Math Support at BHS

- All Math teachers available for help FLEX block twice a 6-day cycle
- Volunteer Tutors during lunch and Flex block in AAC
- NHS student tutors
- Math Lab minor class in second year
- AAC has 0.5 Title I Math Support
- About 159 in an Academic Achievement Center support
- Students in Calculus Project assigned to a math teacher for Flex

MCAS Scores: Dip or a Trend?

E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
										FREE REPONSE QUESTIONS: 24 total points					
	Race	SPED?	Economically Disadvantaged	Title 1 Support	Math Course 10th	MCAS Level	MCAS Scaled Score	Points from Proficient	Possible Points to earn from Open Reponse	OR #1	OR #2	OR #3	OR #4	OR #5	OR #6
1		Public Day			Data Not Available	NI	238	1		Data not available					
2	White				Geometry H	NI	238	1	14	1	1	2	2	2	2
3	White	Inclusion			Geometry	NI	234	3	16	1	1	2	1	1	2
4	White	Sub Seperate			Geometry	NI	234	3	17	1	0	2	2	1	1
5	White	Inclusion			Geometry	NI	234	3	18	2	0	2	1	0	1
6	African Am.		Yes	Yes	Algebra I	NI	232	4	16	1	1	1	1	2	2
7	African Am.				Geometry	NI	230	5	16	1	2	2	1	1	1
8	White	Inclusion	Yes		Algebra I	NI	230	5	18	1	2	2	1	0	0
9	White	Inclusion			Geometry	NI	230	5	14	3	0	1	1	2	3
10	White	Inclusion			Geometry	NI	230	5	16	3	2	1	1	1	0
11	White	Inclusion			Geometry	NI	228	6	17	0	2	1	1	2	1
12	White	Inclusion		Yes	Algebra I	NI	224	8	18	0	1	2	1	1	1
13	African Am.		Yes		Algebra I	NI	220	10	17	1	1	0	1	2	2
14	White	Inclusion			STEM m	F	216	15	21	1	0	1	1	0	0
15	White	Inclusion		Yes	Algebra I	F	204	26	23	0	0	0	1	0	0

2017 Tenth Grade: 13 NI and 2 Failure

MCAS 2.0 and Beyond...

Goal: All learners meeting or exceeding expectations on MCAS 2.0.

Dilemma: We don't want MCAS to consume all that we do.

Standards Based

- We must guarantee grades 6-10 are teaching the standards assessed on MCAS as a minimum bar.

Sound Lessons

- Objective-based
- Chunked lessons, variety of activities
- Guided and independent practice
- Regular checks for understanding
- Pose purposeful questions
- Rich classroom tasks that promote reasoning and problem solving.
- Productive Struggle

Authentic Literacy

- Meaningful opportunities for learners to read, write, and engage in mathematical discourse with peers to build conceptual understanding and apply quantitative ideas to new contexts.

Adapted from: Michael Schmoker's FOCUS and *NCTM's Principles to Action, Common Core and Deborah Hughes Hallett*