SELECTED SOLUTIONS AND COMMENTS FOR TASKS
Grade 7 – Algebra and Geometry

Tasks are intended to serve different purposes. When appropriate, students are encouraged to make choices, think strategically, and explain their reasoning. This document contains answers to selected problems. When answers vary, we try to offer an example when possible. When not possible, we describe what a student response could look like. The solutions in this document are not meant to represent an exhaustive list of suitable answers.

Border Tile Extension (algebra – writing expressions)	
1	Answers will vary. Possible numerical expressions for the 6 x 8 rectangle include (but certainly are not limited to): 6 + 6 + (8 – 2) + (8 – 2) 2(6 – 2) + 2(8) 2(6) + 2(8 – 2) 4(6) Possible numerical expressions for the 5 x 7 rectangle include (but certainly are not limited to): 5 + 5 + (7 – 2) + (7 – 2) 2(5 – 2) + 2(7) 2(5) + 2(7 – 2) 4(5)
2	Possible numerical expressions for the 4 x 6 rectangle include (but certainly are not limited to): 4 + 4 + (6 – 2) + (6 – 2) 2(4 – 2) + 2(6) 2(4) + 2(6 – 2) 4(4)
3	If the shorter side is n, the longer side is $n + 2$. Possible algebraic expressions for the n x (n + 2) rectangle include (but certainly are not limited to): $n + n + (n + 2 – 2) + (n + 2 – 2) = 4n$ $2(n) + 2(n + 2 - 2) = 4n$
4	Possible numerical expressions for the 9 x 9 grid include (but certainly are not limited to): 2(9) + 2(9) + 2(5) + 2(5) 9 + 9 + 9 + 9 + 5 + 5 + 5 + 5 4(9) + 4(5) Possible numerical expressions for the 7 x 7 grid include (but certainly are not limited to): 2(7) + 2(7) + 2(3) + 2(3) 7 + 7 + 7 + 7 + 3 + 3 + 3 + 3 4(7) + 4(3)
5	Possible numerical expressions for the 7 x 7 grid include (but certainly are not limited to): 2(5) + 2(5) + 2(1) + 2(1) 5 + 5 + 5 + 5 + 1 + 1 + 1 + 1 4(5) + 4(1)
6	Possible algebraic expressions for the n x n grid include (but certainly are not limited to): $2(n) + 2(n) + 2(n – 4) + 2(n – 4) = 4n + 4(n – 4) = 8n – 16$ $n + n + n + n + n – 4 + n – 4 + n – 4 + n – 4 = 8n – 16$ $4(n) + 4(n – 4) = 8n – 16$

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Exploring Equations (algebra – solving equations)	
Part A	
1	Answers will vary. $1x + 2 = 9$ yields the greatest value.
2	Answers will vary. $1x - 8 = 9$ and $1x - 9 = 8$ yield the greatest value.
3	Answers will vary. $(1/8)x + 2 = 9$ yields the greatest value for x.
4	Answers will vary. $(1/8)x - 7 = 9$ and $(1/8)x - 9 = 7$ yield the greatest value for x.
Part B	
1-4	Answers will vary.
Part C	
	Answers will vary. Some possible answers include: $1x + 9 = 2$ $9x - 2 = 1$ or $9x - 1 = 2$ $(1/8)x + 9 = 2$ $(9/1)x - 2 = 3$ or $(9/1)x - 3 = 2$

Algebra Number Lines (algebra – writing and graphing inequalities)	
Note	Check all graphs for accuracy.
4	$-1 < A + B < 3$
5	$-1 < B + A < 3$
6	$-2 < A + C < 2$
7	$-3 < B + C < 1$
8	$-3 < B - A < 1$
9	$-1 < A - B < 3$
10	$-1 < B - C < 3$
11	Answers will vary. If you add the least value in the range for A (a positive number very close to 0) and the least value in the range of C (a negative number very close to -2), the sum is a number very close to -2. This represents the least sum of A + C. Using similar reasoning for the greatest value in each range, the greatest sum for A + C is going to close to 2.
12	Answers will vary. The greatest difference for B – C is going to be a value close to 3. This can be found by taking the greatest value in B (a number close to 1) and subtracting the least number in C (a number close to -2). The least difference for B – C (a number close to -1) can be found by taking the least value in B (a number close to -1) and subtracting the greatest number in C (a number close to 0).

Shopping for a Party (algebra – tables, graphs, equations, proportional relationships)	
1	Party Town offers a deal that is a proportional relationship. This relationship would have a table that has pairs of values in columns (or rows) that represent equivalent ratios. The graph would be a line through the origin (discrete points, not a continuous line). The equation would be $y = 2.25x$. The other stores offer deals that do not have a constant rate of change, have unequal ratios in their tables, and cannot be modeled by an equation in the form of $y = mx$. Explanations will vary.
2	Answers will vary. They all offer relatively similar deals. The cheapest option depends on the specific number of hats needed. For example, if you need 10 hats, Economy Party Place offers the cheapest deal for $20. If you need 9 hats, Party Supply House is the cheapest option at $18. If you only need 5 hats, Party Town is your cheapest option.

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Interior Angles of Polygons (geometry – polygons and angles)					
1	Name	# of sides	# of diagonals from any given vertex	# of triangles	Sum of angles
	Triangle	3	0	1	180˚
	Square	4	1	2	360˚
	Pentagon	5	2	3	540˚
	Hexagon	6	3	4	720˚
	Heptagon	7	4	5	900˚
	Octogon	8	5	6	1080˚
	Nonagon	9	6	7	1260˚
	Decagon	10	7	8	1340˚
	"n-gon"	n	n - 3	n - 2	(n – 2) • 180˚
2	Descriptions of patterns will vary. In general, the number of diagonals is 3 less than the number of sides. The number of triangles is 2 less than the number of sides. The sum of the angles is 180˚ times the number of triangles. All patterns are linear.				
3	Explanations will vary.				

Drawing Geometric Figures Using Technology (geometric figures)	
	Check student work for accuracy.

Scale Drawing or Scale Models (geometry and proportional relationships - scale)	
	Drawings and models will vary.

The Graduation Celebration (geometry and proportional relationships - scale)	
1	Drawings will vary.
2	The area of the stage is 225 square feet.
3	You need 9 tables to seat all 75 people. Each table has an area of about 79 square feet. About 706 square feet will be covered by tables. In reality, more space will be needed for chairs and space for folks to walk around.
4	Answers will vary, but it should be square.