

 Amplify Desmos Math **CALIFORNIA**

Mathematics I

**Math Language
Development Resources**

Contents

Unit 1: Patterns and Sequences

Words With Multiple Meanings	
Explore Patterns Found in Nature (Optional) (Activity)	2
1.01 Visual Patterns (Activity 3)	6
1.02 Sequence Carnival (Activity 1)	10
1.03 Recursion Machine (Activity 2)	14
1.04 See the Sequence (Activity 1)	16
1.05 Paper Patterns (Activity 2)	18
1.06 More Visual Patterns (Activity 1)	20
1.07 Tree-Mendous Models (Activity 2)	22

Contents (continued)

Unit 2: Linear Equations and Inequalities

Explore Planning for Homecoming (Optional) (Activity)	24
2.01 Working Backwards (Activity 1)	28
2.02 Solving Strategies (Activity 2)	30
2.03 Same Position (Activity 2)	32
2.04 Subway Seats (Activity 1)	34
2.05 Various Variables (Activity 2)	36
2.06 Shelley the Snail (Activity 1)	38
2.07 Equations of Lines (Activity 1)	40
2.08 Five Representations (Activity 2)	42
2.09 Pizza Delivery (Activity 2)	44
2.10 Graphing Inequalities (Activity 1)	46
2.11 Solutions and Sheep (Activity 1)	48
2.12 Absolute Value Solutions (Activity 1)	50
2.13 All Sorts of Screws (Activity 3)	52
2.14 Bracelet Budgets (Activity 1)	54
2.15 All of the Solutions (Activity 3)	56
2.16 Charity Concerts (Activity 1)	58
2.17 Water Way (Activity 3)	60

Contents (continued)

Unit 3: Systems of Linear Equations and Inequalities

Explore A Community Fundraiser (Optional) (Activity)	62
3.01 Shape It Up (Optional) (Activity 1)	66
3.02 Eliminating Shapes (Activity 2)	68
3.03 Process of Elimination (Activity 1)	70
3.04 Solution by Substitution (Activity 2)	72
3.05 Lizard Lines (Activity 3)	74
3.06 City Development (Activity 3)	76
3.07 Bus Systems (Activity 2)	78
3.08 Electric Line Zapper (Activity 3)	80
3.09 Quilts (Activity 1)	82
3.10 Seeking Solutions (Activity 2)	84
3.11 Boundaries and Shading (Activity 1)	86
3.12 Community Meals (Activity 1)	88
3.13 Parallel Lines on the Coordinate Grid (Activity 1)	90
3.14 Perpendicular Lines on the Coordinate Grid (Activity 2)	92
3.15 It's All on the Line (Activity 1)	94
3.16 Going the Distance (Activity 1)	96
3.17 Restaurant Math (Activity 2)	98

Contents (continued)

Unit 4: Describing Functions

Explore School Commutes (Optional) (Activity)	100
4.01 Mystery Rule (Activity 1)	104
4.02 Pricing Pizzas (Activity 1)	106
4.03 Toy Factory (Activity 2)	108
4.04 Function Carnival (Activity 1)	110
4.05 Craft-a-Graph (Activity 1)	112
4.06 Plane, Train, and Automobile (Activity 1)	114
4.07 Space Race (Activity 1)	116
4.08 Ins and Outs (Activity 2)	118
4.09 Elevator Stories (Activity 2)	120
4.10 Marbleslides (Activity 1)	122
4.11 Recursion Excursion (Activity 1)	124
4.12 Functions and Sequences (Activity 1)	126
4.13 What's Your Score? (Activity 2)	128
4.14 Absolute Value Machines (Activity 3)	130
4.15 Our Math Stories (Activity 1)	132

Contents (continued)

Unit 5: Exponential Functions

Explore An Epidemic (Optional) (Activity)	136
5.01 Carlos's Fish (Optional) (Activity 1)	140
5.02 Growing Globbs (Activity 2)	142
5.03 Going Viral (Activity 1)	144
5.04 Return of the Globbs (Activity 1)	146
5.05 Carlos and Corals (Activity 1)	148
5.06 Differences and Factors (Activity 1)	150
5.07 Growing Mold (Activity 2)	152
5.08 At a Loss (Activity 1)	154
5.09 Lake Desmosia (Activity 3)	156
5.10 Marbleslides: Exponentials (Activity 2)	158
5.11 Bank Accounts (Activity 1)	160
5.12 Payday Loan (Activity 1)	162
5.13 Credit Card Compounding (Activity 1)	164
5.14 Detroit's Population, Part 1 (Activity 2)	166
5.15 Detroit's Population, Part 2 (Activity 1)	168

Contents (continued)

Unit 6: Rigid Transformations and Congruence

Explore Making Precise Symbols (Optional) (Activity)	170
6.01 Circles and Segments (Activity 2)	174
6.02 Compass Constructions (Activity 2)	176
6.03 Constructing Digitally (Activity 2)	178
6.04 Right in the Middle (Activity 2)	180
6.05 Lines of Construction (Activity 2)	182
6.06 Square Up (Activity 1)	184
6.07 Community Constructions (Activity 2)	186
6.08 Going Off the Grid, Part 1 (Activity 2)	188
6.09 Time to Reflect (Activity 3)	190
6.10 Translation Information (Activity 2)	192
6.11 Rotation Devices (Activity 1)	194
6.12 Going Off the Grid, Part 2 (Activity 2)	196
6.13 Tiles and Patterns (Optional) (Activity 1)	198
6.14 Reflection Symmetry (Activity 1)	200
6.15 Rotational Symmetry (Activity 1)	202
6.16 Transformations as Functions (Activity 2)	204
6.17 Congruent Parts (Part 1) (Activity 1)	206
6.18 Congruent Parts (Part 2) (Activity 1)	208
6.19 Congruent Triangles (Part 1) (Activity 2)	210
6.20 Congruent Triangles (Part 2) (Activity 1)	212
6.21 Triangle Palindromes (Activity 1)	216
6.22 Another Triangle Congruence Theorem (Activity 1)	218

Contents (continued)

Unit 7: Describing Data

Words With Multiple Meanings	220
Explore A Statistical Question (Optional) (Activity)	222
7.01 Survey Says (Optional) (Activity 1)	226
7.02 Hear Here (Activity 2)	228
7.03 School Choice (Activity 3)	230
7.04 Love It or Leave It (Activity 2)	232
7.05 Better Weather? (Activity 2)	234
7.06 Shapes of Data (Activity 1)	236
7.07 Quick Pick (Activity 1)	238
7.08 Finding Desmo (Activity 1)	240
7.09 Wavering Weather (Activity 1)	242
7.10 Race Car (Activity 3)	244
7.11 Far Out (Activity 1)	246
7.12 Dynamic Decades (Activity 1)	248
7.13 Correlation Coefficient (Activity 2)	250
7.14 How Hot Is It? (Activity 2)	252
7.15 City Slopes (Activity 2)	254
7.16 Residual Fruit (Activity 2)	256
7.17 Penguin Populations (Activity 2)	258
7.18 Behind the Headlines (Activity 1)	260
7.19 City Data (Activity 2)	262

Name: Date: Period:

Words With Multiple Meanings

Draw a picture or write in words to show the meaning of the term *arithmetic* that is used in this unit and another meaning of the term.

Math meaning(s)	
Description	Example
<div style="border: 1px solid gray; border-radius: 15px; padding: 10px; display: inline-block; margin: 10px 0;"> <u>arithmetic</u> </div>	
Description	Example
Another meaning	

Name: _____ Date: _____ Period: _____

Words With Multiple Meanings

Draw a picture or write in words to show the meaning of the term *geometric* that is used in this unit and another meaning of the term.

Math meaning(s)	
Description	Example
<div style="border: 1px solid gray; border-radius: 15px; padding: 10px; display: inline-block; margin: 20px 0;"> <u>geometric</u> </div>	
Description	Example
Another meaning	

Math Habits of Mind: Hábitos mentales matemáticos

I can slow down and first make sense of a challenging problem before trying to solve it.

Puedo ir más despacio y primero comprender un problema difícil antes de intentar resolverlo.

I can represent real-world problems and interpret their solutions within the context of the problem.

Puedo representar problemas del mundo real e interpretar sus soluciones dentro del contexto del problema.

I can justify my thinking and ask questions to help me understand the thinking of others.

Puedo justificar mi razonamiento y hacer preguntas que me ayuden a comprender el razonamiento de los demás.

I can apply the math that I know to solve real-world problems, make assumptions and revise my thinking as needed.

Puedo poner en práctica mis conocimientos matemáticos para resolver problemas del mundo real, formulando hipótesis y modificando mi razonamiento según sea necesario.

I can select an appropriate tool to help me solve problems.

Puedo seleccionar una herramienta adecuada que me ayude a resolver problemas.

I can communicate my thinking and solutions clearly to others.

Puedo comunicar mi razonamiento y soluciones claramente a los demás.

I can look for structure or patterns to help me solve problems.

Puedo buscar estructuras o patrones que me ayuden a resolver problemas.

I can look for repeated calculations and other repeated steps to make generalizations.

Puedo buscar cálculos y otros pasos repetidos para hacer generalizaciones.

Name: Date: Period:

Questions and Sentence Frames

Why did you choose this habit of mind?

Did you choose any others? Why or why not?

What part of the Activity reminded you of this habit of mind?

Can you tell me more?

I chose this habit of mind because . . .

I also chose _____ because . . .

In the Activity, I . . .

Name: _____ Date: _____ Period: _____

Pattern C

Pattern A

Figure 1 Figure 2 Figure 3

Figure	Number of Tiles
1	5
2	9
3	13
4	17

Pattern B

Figure 1 Figure 2 Figure 3

Figure	Number of Tiles
1	1
2	3
3	6
4	10

Here are the two visual patterns we've seen.

How are these patterns alike? How are they different?

Discuss:

Where do you see _____?

Can you show me how _____?

What makes you think _____?

How does that compare to _____?

What I am hearing you say is _____.

Is that right?

I want to add that . . .

In this case, . . .

Write:

Alike	Different
In both patterns, . . .	The patterns are different because they . . .
When you move from one figure to the next, . . .	Pattern A . . . Pattern B . . .
Both tables . . .	Pattern A/B _____, but . . .

Name: _____ Date: _____ Period: _____

Seeing Sequences

Definition	$\begin{array}{ccccccc} & \times 4 & & \times 4 & & \times 4 & \\ & \curvearrowright & & \curvearrowright & & \curvearrowright & \\ 2, & 8, & 32, & 128 & & & \end{array}$	Characteristics
<div style="border: 1px solid gray; border-radius: 50%; padding: 10px; display: inline-block;"> constant ratio </div>		
Examples/Models	Non-Examples	

Definition	$\begin{array}{ccccccc} & +6 & & +6 & & +6 & \\ & \curvearrowright & & \curvearrowright & & \curvearrowright & \\ 5, & 11, & 17, & 23 & & & \end{array}$	Characteristics
<div style="border: 1px solid gray; border-radius: 50%; padding: 10px; display: inline-block;"> constant difference </div>		
Examples/Models	Non-Examples	

Name: Date: Period:

Recursive Challenges

Troy created this recursive definition by . . . Then he . . .

I think Troy . . . to . . .

First, Troy . . . Then he . . .

Troy can improve his work by . . .



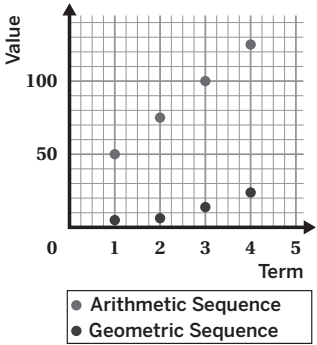
Troy should . . . because . . .

Word bank	
English	Español
add	sumar
subtract	restar
divide	dividir
term	término
sequence	secuencia
constant difference	diferencia constante
constant ratio	razón constante

Name: _____ Date: _____ Period: _____

Sequence Types

a. What are the advantages and disadvantages of each representation?

Representation	Advantages	Disadvantages															
<p>First term: 50 Rule: Constant difference of 25</p>  <p>First term: 3 Rule: Constant ratio of 2</p> 	<p>A recursive definition is useful because it shows how a sequence starts and how it changes.</p>	<p>A recursive definition is not as useful when you want to determine what the later terms of the sequence are.</p>															
<table border="1"> <thead> <tr> <th>Term</th> <th>Arithmetic Sequence</th> <th>Geometric Sequence</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>50</td> <td>3</td> </tr> <tr> <td>2</td> <td>75</td> <td>6</td> </tr> <tr> <td>3</td> <td>100</td> <td>12</td> </tr> <tr> <td>4</td> <td>125</td> <td>24</td> </tr> </tbody> </table>	Term	Arithmetic Sequence	Geometric Sequence	1	50	3	2	75	6	3	100	12	4	125	24	<p>A table is useful because . . .</p>	<p>A table is not as useful . . .</p>
Term	Arithmetic Sequence	Geometric Sequence															
1	50	3															
2	75	6															
3	100	12															
4	125	24															
	<p>A graph is useful because . . .</p>	<p>A graph is not as useful . . .</p>															

b. Choose one representation. Explain how you can use it to help you determine which sequence has the greater 10th term.

The representation I would use to compare the 10th terms would be the recursive definition / table / graph because . . .

Name: _____ Date: _____ Period: _____

Explicit Expressions

How are the explicit expressions for the two patterns alike? How are they different?

Pattern 1 Explicit Expression	Pattern 2 Explicit Expression
$80\left(\frac{1}{2}\right)^n$	$80 - 8n$



Discuss:

Where do you see ...?

What I am hearing you say is ... Is that right?

Can you show me how ...?

I want to add that ...

What makes you think ...?

In this case ...

How does that compare to ...?

Write:

Alike	Different
Both expressions have ____ representing _____.	The expression in Pattern 1 has _____.
I see ____ and ____ in both expressions.	The expression in Pattern 2 has _____.
Both expressions have _____.	The _____ in the expression for Pattern 1 corresponds to _____.
	The _____ in the expression for Pattern 2 corresponds to _____.

Word bank

English	explicit expression	constant difference	constant ratio	multiply	subtract
Español	expresión explícita	diferencia constante	razón constante	multiplicar	restar

Name: Date: Period:

How Many Tiles?

Zoe correctly ...

Zoe incorrectly ... because ...

Zoe was correct/incorrect when she ...

Zoe's mistake was ...

How does this figure suggest ...?

Word bank	
English	Español
constant	constante
difference	diferencia
ratio	razón
sequence	secuencia
figure	figura
expression	expresión

Name: _____ Date: _____ Period: _____

Models in Real Life

For each situation, describe how you might revise Garcia's proposal to better meet the community needs.

Landscapers



Landscapers report they need more time. The timeline was extended to 12 years. They need to plant the same number of trees.

Because the landscapers get 2 more years, . . .

Tree Specialist



A tree specialist says that a percentage of trees die each year.

Because a percentage of trees die each year, the landscapers . . .

Homeowners



Some homeowners cannot maintain trees and do not want trees planted on their land.

The Metropolis Council could . . .

Accountant



An accountant reports that after the third year, the cost of planting trees will increase.

The landscapers could . . .

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Did you choose any others? Why or why not?

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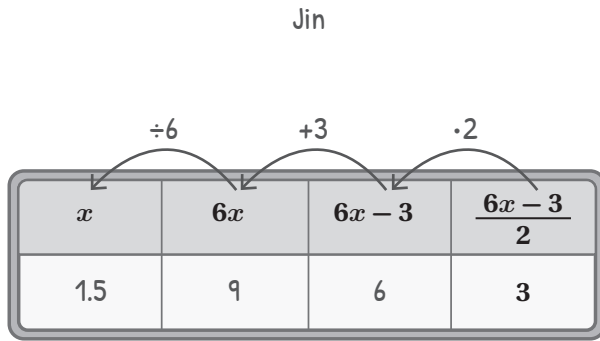
I also chose _____ because . . .

In the Activity, I . . .

Name: _____ Date: _____ Period: _____

Number Machines

Let's look at Jin's and Nasir's strategies for determining what number has to go into the machine for 3 to come out.



Nasir

$$2 \cdot \frac{6x - 3}{2} = 3 \cdot 2$$

$$\frac{6x - 3}{2} = 6$$

$$\frac{6x - 3}{2} + 3 = 6 + 3$$

$$\frac{6x - 3}{2} + \frac{6}{2} = 9$$

$$\frac{6x - 3 + 6}{2} = 9$$

$$\frac{6x + 3}{2} = 9$$

$$6x + 3 = 18$$

$$6x = 15$$

$$x = 1.5$$



Discuss: How are their strategies alike and how are they different?

The strategies are alike in . . .

What makes you think . . .?

The strategies are different in . . .

How does that compare to . . .?

Where do you see . . .?

What I am hearing you say is . . . Is that right?

Can you show me how . . .?

I want to add that . . .

In this case . . .

Write:

Alike	Different
First they _____. Next they _____. Finally they, _____. One thing that is the same is ...	Jin's strategy... Nasir's strategy... One thing that is different is...
Both Jin's and Nasir's strategies are alike because...	Jin's and Nasir's strategies are different because...

Name: _____ Date: _____ Period: _____

Step It Up

Sadia solved the equation by _____.

Amir solved the equation by _____.

I notice that Sadia _____.

I notice that Amir _____.

I wonder why Sadia _____.

I wonder why Amir _____.

First they _____.

Next they _____.

Why do you think . . . ?

What happens if . . . ?

Word bank	
English	Español
add	sumar
subtract	sustraer
multiply	multiplicar
divide	dividir
distribute	distribuir
inverse operation	operación inversa
equivalent equation	ecuación equivalente
balanced equation	ecuación equilibrada

Name: _____ Date: _____ Period: _____

Once, Never, Always

Here are Ava's and Nikhil's strategies for solving a challenge from the previous activity.

Ava

$$\begin{array}{r} 12t = 20t \\ -12t \quad -12t \\ \hline 0 = 8t \\ 0 = t \end{array}$$

they will meet when $0 = t$

Nikhil

$$\begin{array}{r} 12t = 20t \\ \quad \uparrow \quad \uparrow \\ 12 = 20 \end{array}$$

they will never meet



Discuss: How are Ava and Nikhil's strategies alike? How are they different?

Alike	Different
<p>Both Ava and Nikhil's strategies are alike because . . .</p>	<p>Both Ava and Nikhil's strategies are different because . . .</p>



Discuss: Is each strategy correct?

- _____ strategy is correct/incorrect because . . .
- In _____ strategy first, they _____. Next, they _____.
Finally, _____.
- _____ strategy was to _____.
- I see _____ in both strategies.

Name: _____ Date: _____ Period: _____

Crowded Subways

Here is Tiam’s strategy for determining the number of standing passengers that can fit when you know the number of seats.

$$\begin{array}{r}
 \text{Tiam} \\
 6t + 2d = 600 \\
 -6t \quad -6t \\
 \hline
 2d = 600 - 6t \\
 \frac{2d}{2} = \frac{600 - 6t}{2} \\
 d = 300 - 3t
 \end{array}$$

- t is the seating capacity.
- d is the standing capacity.

What do 300 and -3 mean in this situation?


300:

-3 :

Word bank			
English	Español	English	Español
constraint	restricción	fewer	menos
capacity	capacidad	more	más
seating	asientos	equivalent equations	ecuaciones equivalentes
standing	de pie	subway car	vagón de metro
feet	pies	people	gente

Name: _____ Date: _____ Period: _____

Equations and Formulas

11.  **Discuss:** How is solving the equations on the left side like solving the equations on the right?

Where do you see ...?

What I am hearing you say is ... Is that right?

Can you show me how ...?

I want to add that ...

What makes you think ...?

In this case ...

How does that compare to ...?

Write: How are solving the equations alike? How are solving the equations different?

Alike	Different
<ul style="list-style-type: none"> • I see _____ in solving both equations. • Solving the equations on the left is like solving the equations the right because ... • Solving both equations are alike because ... 	<ul style="list-style-type: none"> • The difference between solving both equations is that ... • I _____ when I solved for the equations on the left. • I _____ when I solved for the equations on the right.

Name: _____ Date: _____ Period: _____

Mind the Gap

In the diagram, $4x$ is represented by . . .

In the diagram, $2y$ is represented by . . .

In the diagram, 28 is represented by . . .

On the graph, 14 is shown . . .

On the graph, $2x$ is shown . . .

It looks like _____ represents _____.

_____ corresponds to _____.

The equations are equivalent because . . .

Word bank	
English	Español
blocks	bloques
diagram	diagrama
equation	ecuación
equivalent	equivalente
x -intercept	intersección en x
y -intercept	intersección en y

Name: _____ Date: _____ Period: _____

Building an Equation of a Line

Mateo _____. He should have . . .

The _____ that Mateo identified is incorrect.

The line does not . . .

The line goes through the point _____ and has a slope of _____.

The line represented by the equation . . .

Word bank	
English	Español
add	agregar
coordinates	coordenadas
equation	ecuación
line	línea
negative	negativo
opposite	opuesto
point	punto
positive	positivo
slope	pendiente
subtract	sustraer

Name: _____ Date: _____ Period: _____

Make It

Complete all the representations for this situation.

Equation in Standard Form

Equation in Slope-Intercept Form

Description:

- Each bus ride costs \$2.
- Each train ride cost \$2.50
- Kiana spent \$40 riding the bus and the train last month.

Variables:

- x represents the number of bus rides Kiana took last month.
- y represents the number of train rides Kiana took last month.

Number of Bus Rides, x	Number of Train Rides, y
0	
	12
10	
	4
20	0

Table

Graph


Discuss: Use these sentence frames as you talk with your group about connecting the descriptions, variables, and multiple representations.

- We are trying to . . .
- We already know . . .
- What does this part of _____ mean?
- It looks like _____ represents . . .
- _____ represents _____.
- _____ stands for _____.
- _____ corresponds to _____.
- How else could we show this?

Name: _____ Date: _____ Period: _____

Trampoline World

8. Jamir is planning to host a party at Trampoline World.

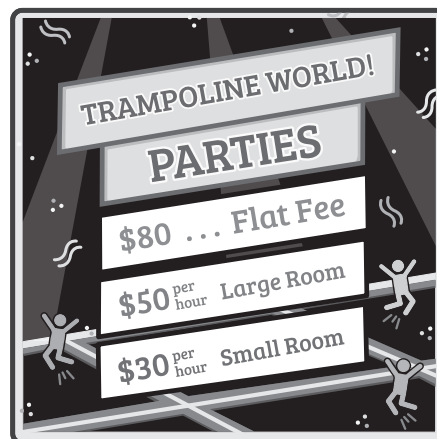
 **Discuss:** What constraints might Jamir think about when planning this party?

I think a possible constraint is _____.

How many _____.

How long _____.

How much _____.



9. Hosting a party at Trampoline World costs a flat fee of \$80, plus \$30 per hour for the small room or \$50 per hour for the large room.

Match each constraint to an inequality, where x represents the number of hours for the party. One inequality will have no match.

$30 + 80x > 140$

$80 + 30x < 140$

$80 + 50x > 140$

$80 + 80x < 140$

Mariana's party in the small room costs at most \$140.	The owner wants to earn at least \$140 for a party in the large room.	Amoli can spend up to \$140 for a party that uses both the big and small rooms.

I think this inequality matches with _____ because . . .

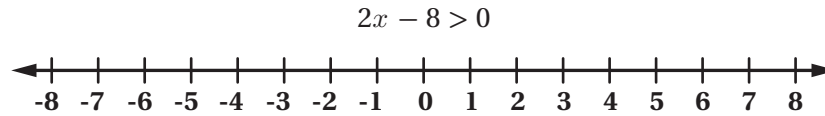
I think this situation matches with _____ because . . .

Word bank					
English	Español	English	Español	English	Español
at most	costo máximo	cost	costo	flat fee	tarifa fija
at least	al menos	people	personas	small room	sala pequeña
constraint	restricción	party	fiesta	large room	sala grande


Name: _____ Date: _____ Period: _____

Show a Solution

3. a Plot a solution to this inequality.



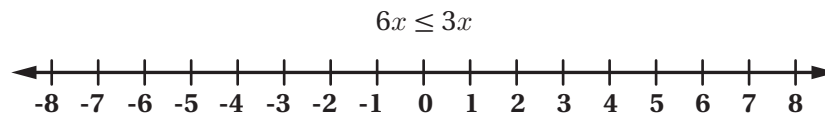
Share your response with your classmates.

- b  **Discuss:** Are any of the points incorrect? How do you know?

No, because . . .

Yes, because . . .

4. a Plot a solution to this inequality.



- b Explain how you know that your point is a solution (or why there is no solution).

I know _____ is a solution because . . .

5. a Lan explains that $6x \leq 3x$ does not have a solution: *6 of something is always more than 3 of the same thing.*

Is Lan's statement correct? Circle one.

Yes

No


I'm not sure

Show or explain your thinking.

Lan's statement is *correct* / *incorrect* because . . .

Name: _____ Date: _____ Period: _____

Feed the Sheep

- a**  **Discuss:** What do you notice and wonder about Kayleen's strategy?

I notice . . .

I wonder . . .

- b** Describe how Kayleen's work can help her decide which way to shade the solution set on the number line.

Kayleen's work helps her because . . .

Because she tested a value on either side of the boundary point, she can . . .

Kayleen knows which way to shade the solution set because . . .

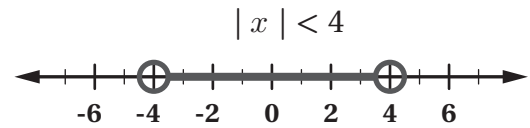
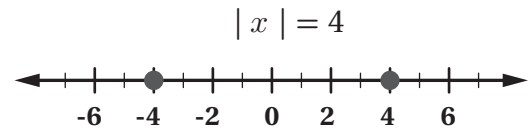
Word bank					
English	inequality	equation	points	shade	boundary point
Español	desigualdad	ecuación	puntos	sombra	punto límite
English	solutions	true	test	left	right
Español	soluciones	verdadero	prueba	izquierda	derecha

Name: _____ Date: _____ Period: _____

Showing Solutions

Complete this Sheet in place of Activity 1, Screen 5 in Digital or in your Student Edition.

Here are all the solutions to $|x| = 4$ and $|x| < 4$.



Discuss: Use these sentence frames as you talk with your partner about how the solutions to $|x| = 4$ and $|x| < 4$ are *alike* and *different*.

- Where do you see . . . ?
- Can you show me how . . . ?
- What makes you think . . . ?
- How does that compare to . . . ?
- What I am hearing you say is . . . Is that right?
- I want to add that . . .
- In this case . . .

How are these solutions alike? How are they different?

Alike	Different
<p>The two solutions . . .</p> <p>For both the equation and the inequality, their solutions . . .</p>	<p>The solutions are different because . . .</p> <p>The solutions to the equation are . . .</p> <p>The solutions to the inequality are . . .</p> <p>The solutions to the equation . . . , but for the inequality . . .</p>

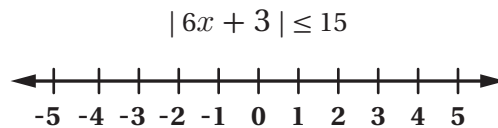
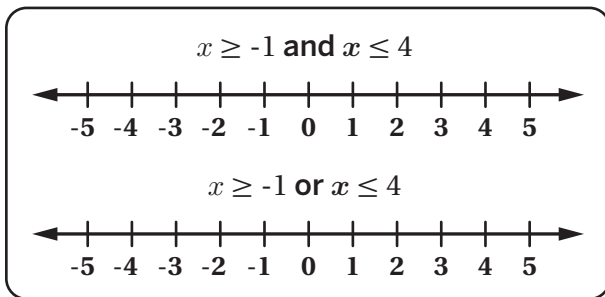
Name: _____ Date: _____ Period: _____

Describing Solutions

Words

“and” versus “or”

Compound Inequality



Examples

Connection to Absolute Value Inequalities

Name: _____ Date: _____ Period: _____

Modeling with Inequalities

The _____ statement describes all the bracelets Binta can buy because . . .

The sign in the statement should be \leq / \geq / $=$ because . . .

This statement makes sense because . . .

I agree because . . .

I disagree because . . .

How do you know . . .

Why do you think . . .

Name: _____ Date: _____ Period: _____

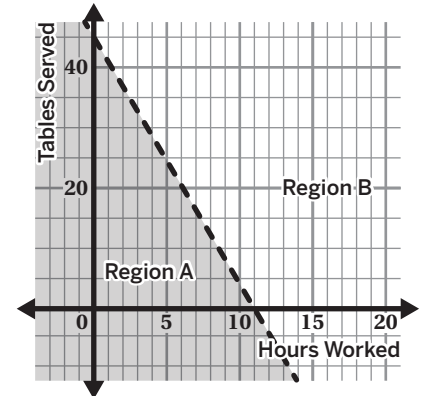
Which Region?

Use this handout to assist you with understanding which region to shade to represent an inequality.

7. Circle the region you chose.

Explain your thinking.

I chose this region because . . .



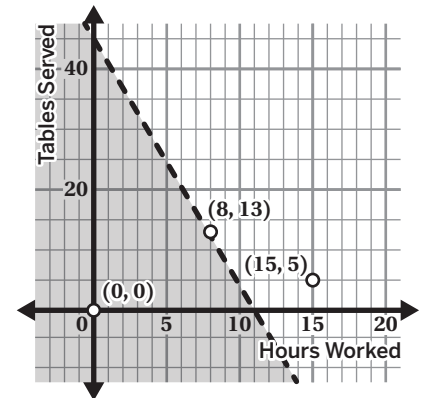
8. Rebecca chose the points (0, 0), (8, 13), and (15, 5).



Discuss:

- a. What do you notice about the location of these points?

- b. Which of these points are solutions to $16x + 4y \geq 180$?



9. Nathan is graphing the solutions to $x + 2y < 4$.



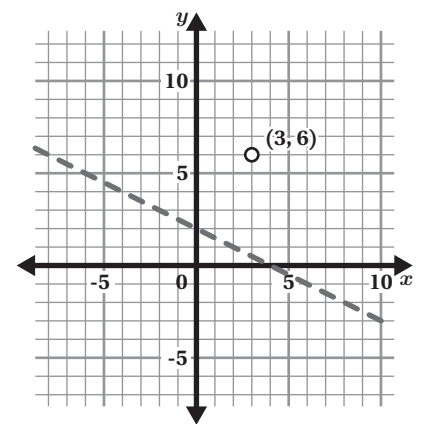
- a. **Discuss:** Why is his line dashed?

The line is dashed to show . . .

- b. Nathan determined that (3, 6) is *not* a solution. Does he have enough information to graph all the solutions?

Yes or No

Explain your thinking: When the point (3, 6) is substituted into the expression $x + 2y$, the result is 15. This means . . . the point is not part of the solution



Word bank

English	region	boundary line	solution(s)	half-plane	greater than	less than
Español	región	línea límite	solución(es)	semiplano	mayor que	menor que

Name: _____ Date: _____ Period: _____

SoundZone Concerts

Use this Sheet as a support when working on Activity 1, Problems 8–10 in your Student Edition.

- 8.** Shade the region on the graph that represents all the solutions to the inequality you wrote. What does the solution mean in this situation?

The solution means . . .

The shaded region represents . . .

- 9.** Are all the solutions to the inequality realistic in this context? Explain your thinking.

All the solutions are/are not realistic because . . .

The only solutions that are realistic are _____ because . . .

Only _____ solutions are realistic because . . .

- 10.** Write a question that the Funk-tions could answer using the graph.

If . . . , how . . . ?

How many concerts do we need to hold if . . . ?



How many tickets do we need to sell if . . . ?

Name: _____ Date: _____ Period: _____

Perspectives

City A wants to build a dam that will make electricity for both cities and store up to 150 billion gallons of water for droughts.

Here are two people that live in City A and City B.

Dalia — City A	Ricardo — City B
<p>Dalia is a farmer in City A.</p> <p>She grows crops on a farm.</p> <p>Her crops are sold to restaurants and stores in City B.</p> 	<p>Ricardo lives in an apartment in City B.</p> <p>His water bill has been increasing each year.</p> <p>If City B receives more water, the cost of water will go down.</p> 

11. If the dam is going to help both cities, how do you think Dalia and Ricardo may feel about your group's decision from Activity 2? Explain your thinking.

Dalia may feel _____ because she *will / will not* . . .

Ricardo may feel _____ because the dam will . . .

12. How do you think the environment and animals could be affected by the dam?

I think the dam could *cause / create / provide* . . .



13. Should City A build the dam? Why or why not?

Yes / No. City A *should / should not* build the dam because . . .

Word bank						
crops	decrease	drought	electricity	energy	habitat	improve
increase	migration	plants	pollution	reproduction	store	unsure

Math Habits of Mind: Hábitos mentales matemáticos

I can slow down and first make sense of a challenging problem before trying to solve it.

Puedo ir más despacio y primero comprender un problema difícil antes de intentar resolverlo.

I can represent real-world problems using equations and inequalities and interpret their solutions within the context of the problem.

Puedo representar problemas del mundo real usando ecuaciones y desigualdades e interpretar sus soluciones dentro del contexto del problema.

I can justify my thinking and ask questions to help me understand the thinking of others.

Puedo justificar mi razonamiento y hacer preguntas que me ayuden a comprender el razonamiento de los demás.

I can apply the math that I know to solve real-world problems, make assumptions and revise my thinking as needed.

Puedo poner en práctica mis conocimientos matemáticos para resolver problemas del mundo real, formulando hipótesis y modificando mi razonamiento según sea necesario.

I can select an appropriate tool to help me solve problems.

Puedo seleccionar una herramienta adecuada que me ayude a resolver problemas.

I can communicate my thinking and solutions clearly to others.

Puedo comunicar mi razonamiento y soluciones claramente a los demás.

I can look for structure or patterns to help me solve problems.

Puedo buscar estructuras o patrones que me ayuden a resolver problemas.

I can look for repeated calculations and other repeated steps to make generalizations.

Puedo buscar cálculos repetidos y otros pasos repetidos para hacer generalizaciones.

Name: Date: Period:

Questions and Sentence Frames

Why did you choose this habit of mind?

Did you choose any others? Why or why not?

What part of the Activity reminded you of this habit of mind?

Can you tell me more?

I chose this habit of mind because . . .

I also chose _____ because . . .

In the Activity, I . . .

Name: _____ Date: _____ Period: _____

Shape Puzzle Strategies

Using Jayden's first step, I can determine _____.

Once I know _____, I can determine _____.

Jayden's first step is helpful in solving the puzzle because . . .

Word bank	
English	Español
column	columna
equal	igual
flower	flor
heart	corazón
row	fila
solution	solución
sum	suma
substitute	sustituir
star	estrella
value	valor

Name: _____ Date: _____ Period: _____

Elimination

1. Listen to your classmate's statement about whose strategy is correct. Think about it! Does it make sense mathematically?
2. Choose your position and decide whether you agree with the statement, disagree with the statement, or have questions about the statement.
3. Show or describe your thinking in writing. Use pictures, diagrams, words, and/or numbers to support your thinking.
4. Be prepared to defend your position.

<p>I agree with my classmate's statement.</p>	<p>The statement makes sense mathematically because . . .</p>
<p>I disagree with my classmate's statement.</p>	<p>The statement does not make sense mathematically because . . .</p>
<p>I am not sure. I have questions about my classmate's statement.</p>	<p>My question is . . .</p>

Name: _____ Date: _____ Period: _____

First Steps of Elimination

Diego's first step was . . .

Diego

$$\begin{array}{l} x + 2y = 11 \\ 4x + y = 2 \end{array} \quad \rightarrow \quad \begin{array}{l} x + 2y = 11 \\ 8x + 2y = 4 \end{array}$$

Next, Diego . . .

$$\begin{array}{r} x + 2y = 11 \\ -(8x + 2y = 4) \\ \hline -7x = 7 \\ x = -1 \end{array}$$

Finally, Diego . . .

Next, I think Diego should . . .

Word bank					
English	Español	English	Español	English	Español
add	agregar	multiply	multiplicar	solve	resolver
equation	ecuación	substitute	sustituir		
equivalent	equivalente	subtract	sustraer		

Original System

$$\begin{array}{l} x + 2y = 11 \\ 4x + y = 2 \end{array}$$

New system

$$\begin{array}{l} x = -1 \\ x + 2y = 11 \end{array}$$

Ariel created the first equation . . .

Both systems will have the same solution . . .

Name: Date: Period:

Practicing Substitution

My first step for solving System A / B / C would be . . .

I would use substitution / elimination to solve System A / B / C because . . .

Substitution / Elimination works best for this system because . . .

To use substitution / elimination I would have to . . .

The first / second equation in the system should be . . .

Word bank	
English	Español
add	sumar
eliminate	eliminar
elimination	eliminación
equation	ecuación
first	primero
isolate	aislar
multiply	multiplicar
second	segundo
substitute	sustituir
substitution	sustitución
solve	resolver
step	paso
subtract	sustraer
system	sistema
variable	variable

Name: _____ Date: _____ Period: _____

Graphing Systems

1. Read Jaleel's and Irene's claims. Decide whose claim is correct.
2. Justify your thinking. Use pictures, diagrams, words, and/or numbers to support your thinking.
3. Be prepared to defend your position.

I think Jaleel's claim is correct / incorrect.	Jaleel's claim <i>makes sense / does not make sense</i> because . . .
I think Irene's claim is correct / incorrect.	Irene's claim <i>makes sense / does not make sense</i> because . . .
I am not sure. I have questions about Jaleel's and Irene's claims.	My question is . . .

Name: _____ Date: _____ Period: _____

Comparing Proposals

An advantage of building apartments / houses is . . .

A disadvantage of building apartments / houses is . . .

Apartments / Houses allow . . .

Apartments / Houses could _____ because . . .

The city should consider _____ because . . .

Word bank					
English	Español	English	Español	English	Español
advantage	ventaja	environment	ambiente	more	más
animals	animales	families	familias	people	gente
apartment	apartamento	green space	espacio verde	plants	plantas
cause	causa	habitat	hábitat	plot of land	parcela de tierra
community	comunidad	house	casa	pollution	polución
cost	costo	improve	mejorar	proposal	propuesta
decrease	disminuir	increase	aumentar	same	igual
disadvantage	desventaja	less	menos	space	espacio

Name: _____ Date: _____ Period: _____

Making Recommendations

7. Which configuration would you recommend for Bus Line 1? Circle one.

Configuration A Configuration B Configuration C Configuration D

Explain your thinking.

This configuration makes sense for Bus Line 1 because . . .

8. Which configuration would you recommend for Bus Line 2? Circle one.

Configuration A Configuration B Configuration C Configuration D

Explain your thinking.

This configuration makes sense for Bus Line 2 because . . .

9.  **Discuss:** What else should the MTA consider when choosing a configuration for a bus line?

- I've noticed that . . .

- I wonder about . . .

- More information could be found by . . .

Word bank					
English	Español	English	Español	English	Español
children	niños	persons with disabilities	personas con discapacidad	shopping	compras
crowded	concurrido	longer time	más tiempo	sitting	sentado
elderly	anciano	luggage	equipaje	standing	de pie
empty	vacío	shorter time	menos tiempo	travel	viaje

Name: _____ Date: _____ Period: _____

Repeated Challenges

Use this sheet to help you explain what Adah's work says about the system of equations.

Adah tried to light up these lines with one zap:

$$y = 3x + 4$$

$$y = 3x - 2$$

Adah

$$y = 3x + 4 \qquad y = 3x - 2$$

$$3x + 4 = 3x - 2$$

$$3x + 6 = 3x$$

$$6 = 0$$

The equations have the same _____ but different _____.

The equations tell me that the graphs of the lines are:

- A. different lines that meet at one point.
- B. the same line that overlaps everywhere.
- C. parallel lines that never intersect.

When Adah solves correctly but runs into a false statement, it means there are / is :

- A. infinitely many solutions.
- B. no solution.
- C. one solution.

What does her work say about this system of equations?

This means that . . .

Name: _____ Date: _____ Period: _____

Sai's Quilt

The white region

A point in this region means the quilt . . .

The blue region

A point in this region means the quilt . . .

What does it mean when the point is in this region?

A point in this region means the quilt . . .

A point in this region means the quilt . . .

The red region

The red and blue region

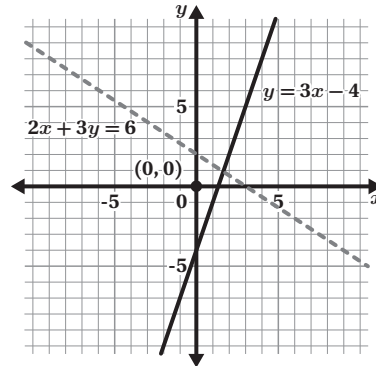
Word bank					
English	Español	English	Español	English	Español
constraint	restricción	large	grande	small	pequeño
cost	costo	quilt	colcha		
expensive	caro	size	tamaño		

Name: _____ Date: _____ Period: _____

Where Is the Solution Region?

7. Terrance is trying to graph the solutions to this system of inequalities. First, he tests the point $(0, 0)$.

$2x + 3y > 6$	
$y \geq 3x - 4$	
Dashed Line	Solid Line
$2(0) + 3(0) > 6$	$0 \geq 3(0) - 4$
$0 + 0 > 6$	$0 \geq 0 - 4$
$0 > 6$	$0 \geq -4$
False!	True!



Discuss: What can Terrance do next to determine the solution region?

I think Terrance could . . .

Since . . .

Then he could . . .

Critique: Use these sentence frames as you discuss what is correct in Terrance's work.

- | | |
|--|--|
| <ul style="list-style-type: none"> • Terrance is correct in _____. • It looks like Terrance thought that _____ represents _____. | <ul style="list-style-type: none"> • Terrance's first step works because _____. |
|--|--|

Correct: Use these sentence frames as you discuss what is incorrect or unclear in Terrance's work.

- | | |
|---|---|
| <ul style="list-style-type: none"> • Terrance is incorrect in _____. • Another strategy would be _____ because _____. | <ul style="list-style-type: none"> • Terrance's method doesn't work because _____. |
|---|---|

Clarify: Use these sentence frames as you create a question for how Terrance's work can be improved or create a revised response.

- | | |
|---|--|
| <ul style="list-style-type: none"> • How can Terrance use _____? | <ul style="list-style-type: none"> • Terrance should _____. |
|---|--|

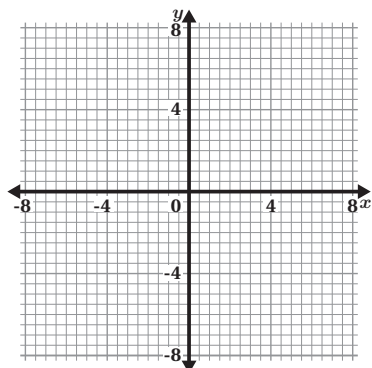
Name: _____ Date: _____ Period: _____

Rounds of Systems

Round 1

My inequality: _____

My partner's inequality: _____



What is one solution to the system? _____

Show or explain your thinking.

The strategy I used was ...

First, I ...

Next, I ...

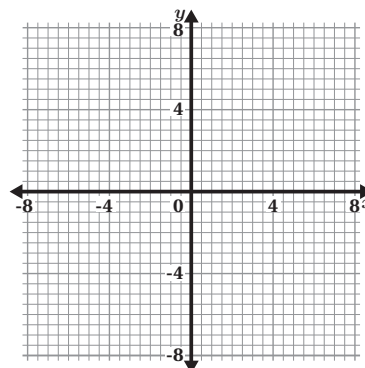
I noticed ...

I determined that the solution was _____
because ...

Round 2

My inequality: _____

My partner's inequality: _____



What is one solution to the system? _____

Show or explain your thinking.

The strategy I used was ...

First, I ...

Next, I ...


I noticed ...

I determined that the solution was _____
because ...

Word bank

English	inequalities	intersect	point	solution region	substitute	test	true	false
Español	desigualdades	intersecarse	punto	región solución	sustituir	prueba	verdadero	falso

Meal Prep

 **Directions:** Make copies and pre-cut. Give each student the appropriate leveled support.
Note: The top portion offers emerging language supports, the middle portion offers expanding language supports, and the bottom portion offers bridging language supports.

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Decide if you think Liam is correct or incorrect. Then complete the sentences to help explain your thinking.

I think Liam is _____ because the amount of _____ meals
(*correct / incorrect*) (vegetarian / non-vegetarian / both)
_____ located in the _____ region of the graph.
(are / are not) (overlapping / non-overlapping)

Decide if you think Liam is correct or incorrect. Then complete the sentences to help explain your thinking.

I think Liam is (*correct / incorrect*) because the _____ created by the number of vegetarian and non-vegetarian meals (*is / is not*) located within the _____. This means that to meet the _____, the number of (*vegetarian / non-vegetarian / both*) meals needs to be located (*inside / outside*) of the _____ region of the _____ graph.

Word bank					
constraints	meals	solution region	ordered pair	overlapping	system of inequalities

Decide if you think Liam is correct or incorrect. Then complete the sentences to help explain your thinking.

I think Liam is _____ because . . .

Word bank						
correct	incorrect	meals	non-vegetarian	ordered pair	system of inequalities	vegetarian

Name: _____ Date: _____ Period: _____


Translated Lines

1. Listen to your classmate's statement about if they agree or disagree with Eva. Think about it! Does it make sense mathematically?
2. Choose your position and decide whether you agree with the statement, disagree with the statement, or have questions about the statement.
3. Show or describe your thinking in writing. Use pictures, diagrams, words, and/or numbers to support your thinking.
4. Be prepared to defend your position.

<p>I agree with my classmate's statement.</p>	<p>The statement makes sense mathematically because . . .</p>
<p>I disagree with my classmate's statement.</p>	<p>The statement does not make sense mathematically because . . .</p>
<p>I am not sure. I have questions about my classmate's statement.</p>	<p>My question is . . .</p>

Name: _____ Date: _____ Period: _____

Prove It

 **Discuss:**

Can you say more about why . . . ?

I think this is true because . . .

What do you mean when you say . . . ?

That could not be true because . . .

When you say _____, do you mean . . . ?

When you _____, then . . .

How do you know . . . ?

What you said makes me think . . .

Write:

When line ℓ / m is _____, then _____.

The slope of line ℓ / m is _____.

_____ can also be written as _____ because . . .

The product of the slopes is _____.

Two perpendicular lines must _____ because _____.

Word bank							
English	image	opposite	perpendicular	product	reciprocals	rotate	slope
Español	imagen	opuesto	perpendicular	producto	recíprocos	rotar	pendiente

Name: _____ Date: _____ Period: _____

Decide and Defend

1. Listen to your classmate's statement about the relationship between the lines. Think about it! Does it make sense mathematically?
2. Choose your position and decide whether you agree with the statement, disagree with the statement, or have questions about the statement.
3. Show or describe your thinking in writing. Use pictures, diagrams, words, and/or numbers to support your thinking.
4. Be prepared to defend your position.

<p>I agree with my classmate's statement.</p>	<p>The statement makes sense mathematically because . . .</p>
<p>I disagree with my classmate's statement.</p>	<p>The statement does not make sense mathematically because . . .</p>
<p>I am not sure. I have questions about my classmate's statement.</p>	<p>My question is . . .</p>

Name: _____ Date: _____ Period: _____

Segment Length

Critique: Use these sentence frames as you discuss what is correct in Pilar's work.

- Pilar is correct in . . .
- It looks like Pilar thought . . .

Correct: Use these sentence frames as you discuss what is incorrect or unclear in Pilar's work.

- Pilar is incorrect in . . .
- I know to determine the length of a segment you must . . .

Clarify: Use these sentence frames as you create a question for how Pilar's work can be improved or create a revised response.

- | | |
|--|--|
| <ul style="list-style-type: none"> • How can Pilar use _____
_____? • What is the _____? | <ul style="list-style-type: none"> • Pilar should . . . |
|--|--|

Word bank

English	Español
add	agregar
coordinates	coordenada
distance	distancia
equation	ecuación
length	longitud
segment	segmento
subtract	sustraer

Name: _____ Date: _____ Period: _____

Capacity

What do you know about the following words? Write down what you think each word means in the context of this restaurant problem.

The last box is blank for you to add any other word you would like to discuss.

Word	Your Ideas	Example
capacity		
pick-up station		
takeout		
altitude		
floor space		
regulations		

Math Habits of Mind: Hábitos mentales matemáticos

I can slow down and first make sense of a challenging problem before trying to solve it.

Puedo ir más despacio y primero comprender un problema difícil antes de intentar resolverlo.

I can represent real-world problems and interpret their solutions within the context of the problem.

Puedo representar problemas del mundo real e interpretar sus soluciones dentro del contexto del problema.

I can justify my thinking and ask questions to help me understand the thinking of others.

Puedo justificar mi razonamiento y hacer preguntas que me ayuden a comprender el razonamiento de los demás.

I can apply the math that I know to solve real-world problems, make assumptions and revise my thinking as needed.

Puedo poner en práctica mis conocimientos matemáticos para resolver problemas del mundo real, formulando hipótesis y modificando mi razonamiento según sea necesario.

I can select an appropriate tool to help me solve problems.

Puedo seleccionar una herramienta adecuada que me ayude a resolver problemas.

I can communicate my thinking and solutions clearly to others.

Puedo comunicar mi razonamiento y soluciones claramente a los demás.

I can look for structure or patterns to help me solve problems.

Puedo buscar estructuras o patrones que me ayuden a resolver problemas.

I can look for repeated calculations and other repeated steps to make generalizations.

Puedo buscar cálculos repetidos y otros pasos repetidos para hacer generalizaciones.

Name: Date: Period:

Questions and Sentence Frames

Why did you choose this habit of mind?

Did you choose any others? Why or why not?

What part of the Activity reminded you of this habit of mind?

Can you tell me more?

I chose this habit of mind because . . .

I also chose _____ because . . .

In the Activity, I . . .

Name: _____ Date: _____ Period: _____

What Is a Function?

Rules A and B are examples of a *function*.

Rule C is *not* a function.

What do you think makes Rule C not a function?

I think Rule C is not a function because. . .

Rule C is not a function because. . .

For example. . .

Functions

Rule A		Rule B	
Input	Output	Input	Output
5	16	howdy	8
6	19	face	6
0	1	mountain	13
5	16	flower	6

Not a function

Rule C	
Input	Output
5	watch
9	vegetable
9	classroom
1	a

Word bank				
English	input	output	rule	function
Español	entrada	salida	regla	función

Name: _____ Date: _____ Period: _____

Pricing Pizzas

Critique: Use these sentence frames as you discuss what is correct in Luca's work.	
<ul style="list-style-type: none"> Luca is correct in . . . It looks like Luca thought that _____ represents . . . 	<ul style="list-style-type: none"> Luca's method works because . . .
Correct: Use these sentence frames as you discuss what is incorrect or unclear in Luca's work.	
<ul style="list-style-type: none"> Luca is incorrect in . . . Another strategy would be _____ because . . . 	<ul style="list-style-type: none"> Luca's method doesn't work because . . .
Clarify: Use these sentence frames as you create a question for how Luca's work can be improved or create a revised response.	
<ul style="list-style-type: none"> Is there another way to say/do . . .? How can Luca use . . .? 	<ul style="list-style-type: none"> Luca should . . .

On the previous problem, Luca said:

s times 3 is 17.25, so a small pizza with 3 toppings will cost \$5.75.

What would you say to help him understand his mistake?

Luca thinks that . . .

When reading the statement . . .

Luca

$$\frac{s(3)}{3} = \frac{17.25}{3}$$

$$s = 5.75$$

Name: Date: Period:

Writing Equations of Functions

I think Kimaya is correct because . . .

I think Kimaya is incorrect because . . .

Kimaya's function shows . . .

Tariq's function shows . . .

Kimaya's statement is true because . . .

Kimaya's statement is not true because . . .

Word bank					
English	exponent	base	width	equation	bow tie
Español	exponente	base	ancho	ecuación	corbata de moño

Name: _____ Date: _____ Period: _____

Cannon Person

I notice that the graph _____.

I notice that _____ is connected to _____ in the graph.

_____ corresponds to _____.

To be more precise, the graph _____.

Another way to show _____ is _____.

How else could we show this?

Word bank	
English	Español
rate of change	tasa de cambio
up	arriba
down	abajo
height	altura
increasing	creciente
decreasing	decreciente
maximum	máximo
parabola	parábola
linear	lineal
slope	pendiente

Name: Date: Period:

Build It

This graph could be Latifa's because . . .

This graph cannot be Latifa's because . . .

I notice this graph _____ so it could/cannot be Latifa's because . . .

These graphs are always positive because . . .

I know these graphs have a maximum at $(2, 4)$ because . . .

Word bank								
English	above	below	highest	lowest	maximum	negative	point	positive
Español	arriba	abajo	el más alto	el más bajo	máximo	negativo	punto	positivo

Name: _____ Date: _____ Period: _____

Arjun's Automobile Trip

At first, Arjun was _____.

Then he _____ to _____.

He stayed there for _____ and then _____.

Arjun finished the trip by _____.

What did you mean when you said _____?


Where on the graph do you see _____ part of your story?

Can you point to the part of the graph where Arjun was _____?

What parts of each of our stories are alike? What parts are different?

Name: _____ Date: _____ Period: _____

Comparing Graphs by Key Features

 **Discuss:** Use these sentence frames as you talk with your partner about how your strategy to calculate the average rate of change for Polina and Nekeisha compared to their strategy.

Where do you see . . . ?

What I am hearing you say is . . . Is that right?

Can you show me how . . . ?

I want to add that . . .

What makes you think . . . ?

In this case . . .

How does that compare to . . . ?

Write: How are these strategies alike? How are they different?

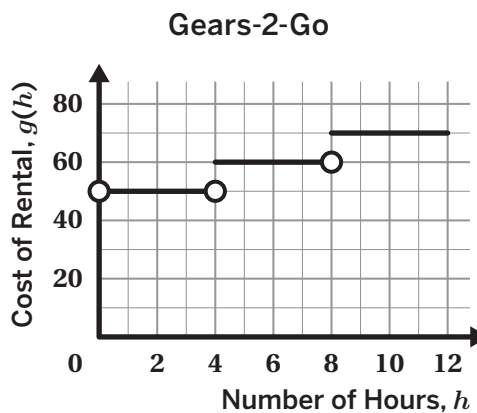
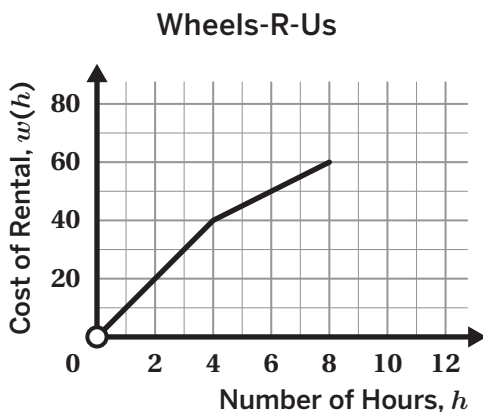
Alike	Different
<ul style="list-style-type: none"> • One thing that is the same is . . . 	<ul style="list-style-type: none"> • One thing that is different is . . .
<ul style="list-style-type: none"> • Both of our strategies are alike because . . . 	<ul style="list-style-type: none"> • My partner used _____ method to determine . . .

Word bank					
English	Español	English	Español	English	Español
average rate of change	tasa de cambio promedio	slope triangle	triángulo de pendiente	faster	más rapido
ordered pairs	pares ordenados	graph	gráfica	slower	más lento
slope	pendiente	time	tiempo	intuition	intuición

Name: _____ Date: _____ Period: _____

What About the Outputs?

Two bike rental companies decided to graph the cost of a bike as a function of time. The functions $w(h)$ and $g(h)$ represent the cost of a bike rental for h hours.



9. The set of all possible outputs of a function is called the range. How would you describe the range of each function?

	$w(h)$	$g(h)$
What are some values in the range for this function?		
How would you make sense of this in context?		
Describe the range for this function.		

Name: _____ Date: _____ Period: _____

Distinguishing Domain and Range

1. Listen to your classmate's statement about whether Ali or Shanice is correct. Think about it! Does their response make sense mathematically?
2. Choose your position and decide whether you agree with their statement, disagree with their statement, or have questions about their statement.
3. Show or describe your thinking in writing. Use pictures, diagrams, words, and/or numbers to support your thinking.
4. Be prepared to defend your position.

<p>I agree with my classmate's statement.</p>	<p>The statement makes sense mathematically because . . .</p>
<p>I disagree with my classmate's statement.</p>	<p>The statement does not make sense mathematically because . . .</p>
<p>I am not sure. I have questions about my classmate's statement.</p>	<p>My question is . . .</p>

Name: _____ Date: _____ Period: _____

Restrict the Domain and Range

I chose _____ because _____.

I know _____ is correct because _____.

_____ makes sense because _____.

Why do you think _____?

I see your point, but _____.

When you say _____, it makes me think about _____.

I agree/disagree with you because _____.

Name: _____ Date: _____ Period: _____

Sequences as Functions

A sequence's *recursive definition* is made up of its first term and rule.

Here are some recursive definitions.

5, 7, 9, 11, 13	10, 6, 2, -2, -6	80, 40, 20, 10, 5
First Term: 5	First Term: 10	First Term: 80
Rule: Constant difference of 2	Rule: Constant difference of -4	Rule: Constant ratio of 0.5


Here is how we write these rules using function notation

$$f(n) = \begin{cases} 5 & n = 1 \\ f(n-1) + 2 & n \geq 2 \end{cases} \quad \left| \quad f(n) = \begin{cases} 10 & n = 1 \\ f(n-1) + (-4) & n \geq 2 \end{cases} \quad \left| \quad f(n) = \begin{cases} 80 & n = 1 \\ f(n-1) \cdot 0.5 & n \geq 2 \end{cases}$$

What do you notice? What do you wonder?

I notice...


I wonder...

 **Discuss:** What does $f(n-1)$ mean?

$f(n-1)$ means _____.

 **Discuss:** What does $f(n-1) + 2$ mean?

$f(n-1) + 2$ means you take the value of the term before it and _____.

 **Discuss:** What does $f(n-1) + (-4)$ mean?

$f(n-1) + (-4)$ means you take the value of the term before it and _____.

 **Discuss:** What does $f(n-1) \cdot 0.5$ mean?

$f(n-1) \cdot 0.5$ means you take the value of the term before it and _____.

Name: Date: Period:

Recursive and Explicit

To write the recursive definition, I . . .

To write the explicit definition, I . . .

First, I _____. Then, I _____.

An error someone might make when writing definitions of sequences is . . .

Word bank	
English	Español
arithmetic	aritmética
constant difference	diferencia constante
constant ratio	razón constante
first term	primer término
function	función
geometric	geométrico
pattern	patrones
previous term	término anterior
sequence	secuencia
term	término

Name: _____ Date: _____ Period: _____

Absolute Value Functions

This function gives the score because . . .

I chose _____ because . . .

_____ makes sense because . . .

I (agree / disagree) because . . .

Why do you think _____?

How do you know _____?

I see your point, but . . .

When you say _____, it makes me think . . .

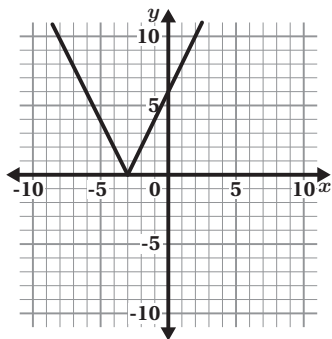
Name: _____ Date: _____ Period: _____

More Graphs of Absolute Value Functions

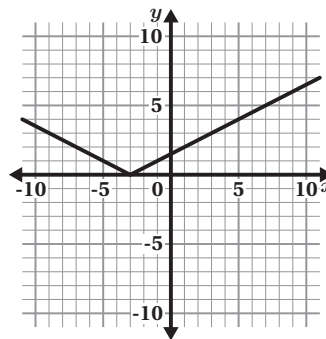
Complete this Sheet in place of Activity 3, Screen 11 in the digital activity or in your Student Edition.

Laila and Bao graphed two different absolute value functions.

Laila graphed $h(x) = 2|x + 3|$.



Bao graphed $k(x) = \frac{1}{2}|x + 3|$.



Discuss: How are the two absolute value functions and their graphs alike? How are they different? Use the word bank to help with your comparison.

Word bank			
English	Español	English	Español
minimum	mínimo	narrow	estrecho
maximum	máximo	wide	ancho
domain	dominio	x -value	valor x
range	rango	y -value	valor y

How do Laila's and Bao's functions and graphs compare to those on Screen 10?

All of the functions . . .

All of the graphs . . .

Compared to the graph on Screen 10, Laila's graph . . .

Compared to the graph on Screen 10, Bao's graph . . .

How does the coefficient in front of the absolute value affect the graph of the function?

When the coefficient is greater than _____, the graph is _____ than the original function.

When the coefficient is between _____ and _____, the graph is _____ than the original function.

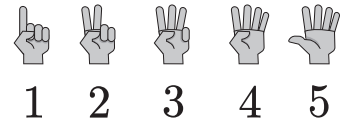
Name: _____ Date: _____ Period: _____

Storytime

Complete this Sheet in place of Activity 1, Problems 6 and 7 in your Student Edition.

Faaria is another student in Adrian's class. She shared these moments from her math story:

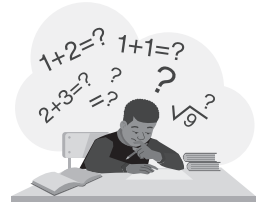
- My earliest math experience was when I was at daycare. We counted with our fingers.



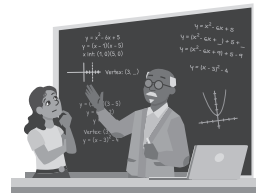
- In 2nd grade, I loved playdough. I liked to make smaller shapes and put them together to make complicated pieces.



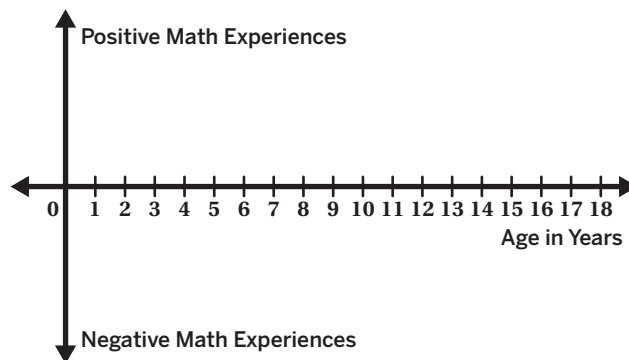
- In middle school, my experiences changed when my classes got harder. I had no idea what was going on. Sometimes, it was hard to show up and take notes.



- In high school, math was difficult for me, but my experiences were generally positive.



6. Sketch a graph that could represent Faaria's story.




Name: Date: Period:

Storytime (continued)

7. Use the vocabulary you've learned in this unit to compare your graph with a classmate's.

Word bank			
English	Español	English	Español
maximum	máximo	domain	dominio
minimum	mínimo	range	rango
positive	positivo	interval	intervalo
negative	negativo	increasing	creciente
slope	pendiente	decreasing	decreciente

 **Discuss:** How are your graphs the same? How are they different?

Math Habits of Mind: Hábitos mentales matemáticos

I can slow down and first make sense of a challenging problem before trying to solve it.

Puedo ir más despacio y primero darle sentido a un problema difícil antes de intentar resolverlo.

I can represent real-world problems and interpret their solutions within the context of the problem.

Puedo representar problemas del mundo real e interpretar sus soluciones dentro del contexto del problema.

I can justify my thinking and ask questions to help me understand the thinking of others.

Puedo justificar mi razonamiento y hacer preguntas que me ayuden a comprender el razonamiento de los demás.

I can apply the math that I know to solve real-world problems, make assumptions and revise my thinking as needed.

Puedo poner en práctica mis conocimientos matemáticos para resolver problemas del mundo real, formulando hipótesis y modificando mi pensamiento según sea necesario.

I can select an appropriate tool to help me solve problems.

Puedo seleccionar una herramienta adecuada que me ayude a resolver problemas.

I can communicate my thinking and solutions clearly to others.

Puedo comunicar mi razonamiento y soluciones claramente a los demás.

I can look for structure or patterns to help me solve problems.

Puedo buscar estructuras o patrones que me ayuden a resolver problemas.

I can look for repeated calculations and other repeated steps to make generalizations.

Puedo buscar cálculos y otros pasos repetidos para hacer generalizaciones.

Name: Date: Period:

Questions and Sentence Frames

Why did you choose this habit of mind?

Did you choose any others? Why or why not?

What part of the Activity reminded you of this habit of mind?

Can you tell me more?

I chose this habit of mind because . . .

I also chose _____ because . . .

In the Activity, I . . .

Name: _____ Date: _____ Period: _____

Doubles Every Hour

$$m = 25 \cdot 2^t$$

Time (hours)	Mass (grams)
0	25
1	50
2	100
3	200
4	400
5	800

In the table, 2 is _____.

In the equation, 2 is _____.

In the table, 25 is _____.

In the equation, 25 is _____.

The t in the equation represents . . .The m in the equation represents . . .

Word bank						
English	base	fish	grams	initial value	mass	time
Español	base	pescado	gramos	valor inicial	masa	tiempo

Name: _____ Date: _____ Period: _____

Comparing Growth

1. Read Fabiana's and Lukas's claims. Decide whose claim is correct.
2. Justify your thinking. Use pictures, diagrams, words, and/or numbers to support your thinking.
3. Be prepared to defend your position.

<p>I think Fabiana's claim is correct / incorrect.</p>	<p>Fabiana's claim <i>makes sense</i> / <i>does not make sense</i> because . . .</p>
<p>I think Lukas's claim is correct / incorrect.</p>	<p>Lukas's claim <i>makes sense</i> / <i>does not make sense</i> because . . .</p>
<p>I am not sure. I have questions about Fabiana's and Lukas's claims.</p>	<p>My question is . . .</p>

Name: _____ Date: _____ Period: _____

Three Memes

The graphs are alike . . .

The graphs are different . . .

I notice . . .

Word bank						
English	rate of change	exponential	growth factor	initial value	linear	steep
Español	tasa de cambio	exponencial	factor de crecimiento	valor inicial	lenta	inclinado

The graph that represents the cat meme is _____ because . . .

The graph that represents the dog meme is _____ because . . .

The graph that represents the duck meme is _____ because . . .

Name: _____ Date: _____ Period: _____

Return of the Globbs

Green Globbs

Situation: At first, there are 4 globbs. 6 more globbs are added each day.

Starting Value

In the table, I can see . . .

On the graph, I can see . . .

In the equation, I can see . . .

Constant Rate of Change

In the table, I can see . . .

On the graph, I can see . . .

In the equation, I can see . . .

Orange Globbs

Equation: $y = 5 \cdot 2^x$

Numbers 5 and 2

In the table, I can see . . .

On the graph, I can see . . .

From the situation, I can see . . .

Name: _____ Date: _____ Period: _____

Carlos's Fish

Use the space provided to evaluate the equation of the function when $m = 5$ and when $m = -1$. Use the sentence frames and the word bank to help you discuss with your partner.

Making Sense

Carlos made this graph to represent the function $m(t) = 10 \cdot 2^t$.

a What is the value of $m(5)$?

b What is the value of $m(-1)$?

c  Discuss:

- What does each value say about the fish's mass?

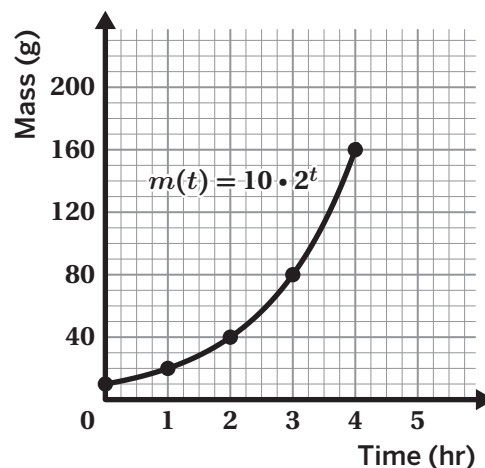
$m(5)$ tells me that the fish . . .

$m(-1)$ tells me that the fish . . .

Do both of those values make sense?

- How would you describe the domain of $m(t)$?

The domain of this function is . . .



Word bank

English	domain	double	growth factor	mass	multiply	weight
Español	dominio	doble	factor de crecimiento	masa	multiplicar	peso

Name: _____ Date: _____ Period: _____

Linear Functions

Use this sheet to help you think through and explain Problems 4–8.

4. As the input values grow by 1, what happens to the output values?

As x increases by 1, $f(x)$. . .

	x	$f(x)$	
+1	0	5	?
+1	1	7	?
	2		
	
+1	7		?
	8		
	
+1	x	$2x + 5$?
	$x + 1$	$2(x + 1) + 5$	

5. Is Precious correct? Circle one.

Yes or No

Explain how you know.

For any two consecutive values of x , $f(x)$. . .

6. $f(x + 1) - f(x) =$

7. Rewrite $(2(x + 1) + 5) - (2x + 5)$

8. Precious's expression has the same value as my answer to Problem 4 because . . .

Any linear function . . .

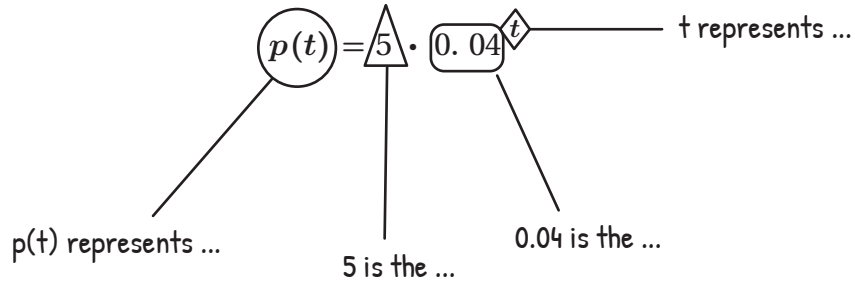
Word bank					
English	consecutive	difference	expression	grows	increases
Español	consecutivo	diferencia	expresión	crece	crece

Name: _____ Date: _____ Period: _____

Growing with Percents

As you discuss and work to answer Problems 10–12, use this sheet and the word bank to help you.

10.



Word bank			
English	Español	English	Español
amount	cantidad	multiply	multiplicar
decay	decaer	percent	porciento
decrease	disminuir	original	original
exponent	exponente	starting	inicial
growth	crecimiento	value	valor
increase	crece		

11. Tyler’s mistake was with (circle one):

$p(t)$ 5 0.04 t

Explain:

12. The 1 represents:

It is there because...

Name: _____ Date: _____ Period: _____

Des-Phone

3. Discuss:

- How are the functions alike?
- How are the functions different?

Alike	Different
<ul style="list-style-type: none"> • I see _____ in both functions. • Both functions have . . . • Both functions are alike because . . . 	<ul style="list-style-type: none"> • The difference between both functions is . . . • Taylor's function shows . . . • Aaliya's function shows . . .

Word bank	
English	Español
base	base
decrease	decrecer
exponent	exponente
exponential	exponencial
initial value	valor inicial
percent	porciento

Name: _____ Date: _____ Period: _____

Comparing Algae Treatments

9.  **Discuss:** What do the graphs tell you about each treatment method?

The graphs tell us that each treatment method . . .

Treatment A . . .

Treatment B . . .

Treatment A's graph shows that . . .

Treatment B's graph shows that . . .

This means . . .

10. Let's take a closer look at Treatment B's function $g(x) = 340 \cdot (0.82)^x + 10$.

a. Write: What do the numbers 0.82 and 10 mean for the situation?

- I think the 0.82 represents _____ because the size of the algae bloom _____. This tells us that . . .
- I think the 10 represents _____. This means that . . .

b. Write: Why is the y -intercept for $g(x)$ not at $(0,340)$?

The y -intercept is at _____ because . . .

Word bank			
English	Español	English	Español
algae bloom	floración de algas	initial value	valor inicial
decay	decrecer	slower	más lento
faster	más rapido	size	tamaño
growth	crecimiento	square meters	metros cuadrados
growth factor	factor de crecimiento		

Name: _____ Date: _____ Period: _____


Challenges

	Translation Description	Effect on the Graph
$g(x) = 6 \cdot 3^{(x+4)} - 2$		
$g(x) = 6 \cdot 3^{(x+4)} - 2$		
Explanation	<p>I think Kiri's function will / will not capture all the stars because . . .</p> <p>To capture the stars, the graph needs to move . . .</p>	

Word bank						
English	horizontal translation	vertical translation	left	right	up	down
Español	traslación horizontal	traslación vertical	izquierda	derecha	arriba	abajo

Name: _____ Date: _____ Period: _____

Earning Interest

 **Discuss:** Use these sentence frames as you talk with your partner about how the functions are alike and different.

Where do you see . . . ?

What I am hearing you say is _____. Is that right?

Can you show me how . . . ?

I want to add that . . .

What makes you think . . . ?

In this case . . .

How does that compare to . . . ?

Write: How are these strategies alike? How are they different?

Alike	Different
<ul style="list-style-type: none"> • The functions are alike because . . . • Both of the functions are _____. 	<ul style="list-style-type: none"> • The functions are different because . . . • One function is _____ while the other is _____. • One function is modeling _____ while the other is modeling _____.

Word bank							
English	compound interest	decreasing	exponential	initial value	increasing	linear	simple interest
Español	interés compuesto	decreciente	exponencial	valor inicial	creciente	lineal	interés simple

Name: _____ Date: _____ Period: _____

Payday Loan

Marc wonders how much money he would owe if he doesn't pay back the loan after 3 years.

He wrote two expressions to represent this situation.

Expression A

$$100 \cdot 1.15^{36}$$

Expression B

$$100 \cdot (1.15^{12})^3$$

 **Discuss:**

- How are the expressions alike? How are they different?
- How much money would he owe after 3 years?

The expressions are alike because _____.

Where do you see _____?

The expressions are different because _____.

Can you show me how _____?

Expression A / B represents _____.

What makes you think _____?

Marc would owe _____ after 3 years.

What I am hearing you say is _____. Is that right?

Marc wrote a third equivalent expression to represent this situation.

Expression C

$$100 \cdot (5.35)^3$$

What interest rate does the 5.35 represent?

435% per year

535% per year

Neither

Write: Explain your thinking using one or more of the sentence frames.

The interest rate is _____ because . . .

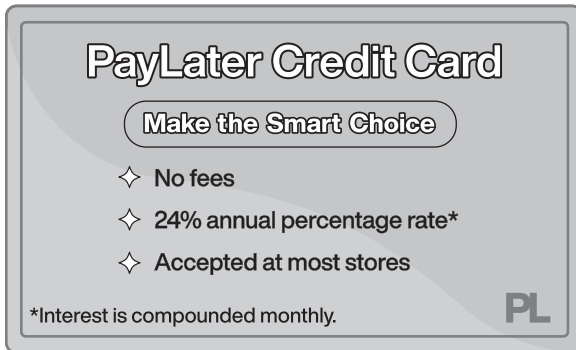
The amount Marc owes is _____, so . . .

When I _____, I . . .

Because _____ represents _____ and the initial value represents _____, I know . . .

Name: _____ Date: _____ Period: _____

PayLater



$$1000(1 + 0.24)^5$$

2. Alejandro is considering charging \$1,000 to this credit card.

He wrote $1000(1 + 0.24)^5$ to determine the balance after 5 years with no payments or additional charges.

Explain what each part of the expression means.

1000:

$1 + 0.24$:

5:

Word bank			
English	Español	English	Español
amount	cantidad	interest	interés
charge	cobro	number	número
credit card	tarjeta de crédito	payment	pago
growth factor	factor de crecimiento	rate	tasa
initial	inicial	year	año

3. The fine print says interest is *compounded* monthly.

This means the interest is $\frac{24}{12} = 2$, or 2% per month.

Compared to compounding annually, how do you think compounding monthly will affect the total Alejandro owes after 5 years? Circle one.

- A. He will owe more B. He will owe less C. He will owe the same

Explain your thinking by completing one of the statements below.

- Compounding monthly will make the total amount _____ compounding annually because you will be multiplying the rate . . .
- The amount owed will be the same because . . .

Name: _____ Date: _____ Period: _____

Predicting the Future

This number *is* / *is not* realistic because . . .

The prediction *is* / *is not* realistic because . . .

I'm not sure if the prediction is realistic because . . .

For the year 2020, the model predicts . . .

The model *provides* / *does not provide* realistic numbers because . . .

The model *is* / *is not* accurate *from* / *until* / *when* . . .

Word bank					
English	Español	English	Español	English	Español
accurate	preciso	greater than	más que	people	gente
calculations	cálculos	less than	menos que	population	populación
data	datos	million	millón	prediction	predicción
function	función	model	modelo	realistic	realista
future	futuro	number	número	years	años

Name: _____ Date: _____ Period: _____

Analyzing Data

The linear model *should* / *should not* be used because . . .

The exponential model *should* / *should not* be used because . . .

Both / *Neither* model(s) should be used because . . .

The *linear* / *exponential* model shows that in 2075 _____, so it *should* / *should not* be used.

I think _____ because . . .

Word bank					
English	Español	English	Español	English	Español
curve	curva	future	futuro	negative	negativo
decrease	decrecer	graph	gráfico	people	gente
events	eventos	increase	crecer	points	puntos
exponential	exponencial	linear	lineal	population	populación
function	función	model	modelo	predict	predecir

Math Habits of Mind: Hábitos mentales matemáticos

I can slow down and first make sense of a challenging problem before trying to solve it.

Puedo ir más despacio y primero comprender un problema difícil antes de intentar resolverlo.

I can represent real-world problems and interpret their solutions within the context of the problem.

Puedo representar problemas del mundo real e interpretar sus soluciones dentro del contexto del problema.

I can justify my thinking and ask questions to help me understand the thinking of others.

Puedo justificar mi razonamiento y hacer preguntas que me ayuden a comprender el razonamiento de los demás.

I can apply the math that I know to solve real-world problems, make assumptions and revise my thinking as needed.

Puedo poner en práctica mis conocimientos matemáticos para resolver problemas del mundo real, formulando hipótesis y modificando mi razonamiento según sea necesario.

I can select an appropriate tool to help me solve problems.

Puedo seleccionar una herramienta adecuada que me ayude a resolver problemas.

I can communicate my thinking and solutions clearly to others.

Puedo comunicar mi razonamiento y soluciones claramente a los demás.

I can look for structure or patterns to help me solve problems.

Puedo buscar estructuras o patrones que me ayuden a resolver problemas.

I can communicate my thinking and solutions clearly to others.

Puedo comunicar mi razonamiento y soluciones claramente a los demás.

I can look for structure or patterns to help me solve problems.

Puedo buscar estructuras o patrones que me ayuden a resolver problemas.

I can look for repeated calculations and other repeated steps to make generalizations.

Puedo buscar cálculos y otros pasos repetidos para hacer generalizaciones.

Name: Date: Period:

Questions and Sentence Frames

Why did you choose this habit of mind?

Did you choose any others? Why or why not?

What part of the Activity reminded you of this habit of mind?

Can you tell me more?

I chose this habit of mind because . . .

I also chose _____ because . . .

In the Activity, I . . .

Name: _____ Date: _____ Period: _____

Under Construction

1. Read Thiago's claim. Decide if the construction is a square, is not a square, or you are not sure and have questions.
2. Justify your thinking. Use pictures, diagrams, words, and/or numbers to support your thinking.
3. Be prepared to defend your position.

<p>Yes, it's a square.</p>	<p>It is a square because . . .</p>
<p>No, it's not a square.</p>	<p>It is not a square because . . .</p>
<p>I am not sure. I have questions about the construction.</p>	<p>My question is . . .</p>

Name: Date: Period:

Compass Constructions

I started the construction by . . .

Then I . . .

Finally, I . . .

Word bank	
English	Español
circle	círculo
compass	compás
construct	construir
hexagon	hexágono
line segment	segmento de línea
shade	sombra
straightedge	regla
triangle	triángulo

Name: _____ Date: _____ Period: _____

Construction Instructions

1. Write a first draft.

- Construct a _____.
- Mark _____.
- Label _____.
- Draw _____.

2. Meet with a partner to discuss your first draft.

- What do you mean when you say _____?
- Could you use a different word for _____?
- Could you label _____?

3. Write a second draft that is stronger and clearer.

Word bank	
English	Español
center	centro
circle	círculo
compass	compás
construct	construir
draw	dibujar
intersection	intersección
label	etiqueta
length	longitud
line segment	segmento de línea
mark	marca
point	punto
radius	radio
straightedge	regla

Name: Date: Period:

Lining It Up

This statement is always / sometimes / never true because . . .

Every point on the perpendicular bisector is . . .

The midpoint is _____ so this means _____.

Word bank	
English	Español
distance	distancia
equidistant	equidistante
midpoint	punto medio
perpendicular bisector	bisectriz perpendicular
point	punto

Name: _____ Date: _____ Period: _____

Can You Construct It on Paper?

Construct a circle centered at point _____ that intersects / goes through _____.

Construct a line that passes through points _____ and _____.

Construct a perpendicular line through _____.

Label where _____ and _____ intersect as point _____.

How do you know that _____?

What do you mean when you say _____?

Could you describe _____ in a different way?

Word bank						
English	center	circle	compass	construct	intersect	label
Español	centro	círculo	compás	construir	intersecarse	etiquetar
English	line	parallel	perpendicular	point	straightedge	through
Español	línea	paralelo	perpendicular	punto	regla	a través de

Name: _____ Date: _____ Period: _____

Square or Not?

I know Sam constructed / did not construct a square because . . .

I'm not sure if Sam constructed a square because . . .

When I move point _____, I notice that . . .

The sides _____ when . . .

Because _____, quadrilateral $ABCD$ must be / cannot be a square.

_____ appear(s) to be _____ because . . .

Word bank					
English	Español	English	Español	English	Español
angle	ángulo	length	longitud	point	punto
center	centro	line	línea	right	recto
circle	círculo	move	mover	segment	segmento
construct	construir	parallel	paralelo	side	lado
equal	igual	perpendicular	perpendicular	square	cuadrado

Name: _____ Date: _____ Period: _____

City Construction



Discuss:

- How can Voronoi diagrams help with community decision-making?
- Why might Springtown consider different locations for the new hospital? Who might be interested in this information?
- How did the construction of the regions change as more hospitals were added?

Because Voronoi diagrams _____, they can be used to . . .

It is important to consider different locations for new community resources because . . .

_____ might be interested in the Voronoi diagrams with the different hospital locations because . . .

As more hospitals were added, the Voronoi diagram . . .

Perpendicular bisectors can be used to help communities . . .

Word bank					
English	Español	English	Español	English	Español
bisector	bisectriz	equidistant	equidistante	planning	planificación
closest	mas cercano	farthest	más lejano	region	región
community	comunidad	hospital	hospital	resource	recurso
decision	decisión	location	ubicación	split	dividir
diagram	diagrama	perpendicular	perpendicular		

Name: _____ Date: _____ Period: _____

Trace and Transform

Translate $\triangle ABC$ up / down / left / right.

Translate $\triangle ABC$ so that point _____ moves onto point _____.

Reflect $\triangle ABC$ vertically / horizontally.

Rotate $\triangle ABC$ a _____ turn _____.
(quarter / half / three-quarters) (clockwise / counterclockwise)

Word bank	
English	Español
clockwise	en el sentido de las manecillas del reloj
counterclockwise	en sentido contrario a las manecillas del reloj
down	abajo
half	medio
horizontally	horizontalmente
left	izquierda
quarter	cuarto
reflect	reflejar
right	derecho
rotate	rotar
three-quarters	tres cuartos
translate	trasladar
turn	girar
up	hacia arriba
vertically	verticalmente

Name: _____ Date: _____ Period: _____

Encompassing Reflections

Use these sentence frames as you discuss Problems 7 and 9 with your partner.

Describe what happens to the preimage, $\triangle QRS$, when it is reflected over line m .

When triangle QRS is reflected over line m , the new image is called . . .

Each point on the pre-image . . .

The corresponding points are . . .

Describe your strategy for reflecting a point over a line using a compass and straightedge.

The first thing I constructed was . . .

Then I . . .

I found the reflected point . . .

Word bank						
English	center	circle	corresponding	distance	image	line
Español	centro	círculo	correspondiente	distancia	imagen	línea
English	maps	perpendicular	point	reflect	strategy	triangle
Español	mapas	perpendicular	punto	reflejar	estrategia	triángulo

Name: _____ Date: _____ Period: _____

Transformation Communication

For Cards 1–4:

My card is number _____.

You will / will not use point E . You will / will not use point F .

This transformation is a reflection. OR This transformation is a translation.

The line of reflection is _____.

The image is connected / not connected to the pre-image.

The image is to the left / right of the pre-image.

The image is at the same level / below the pre-image.

Point _____ is taken to point _____.

For Cards 5–8:

My card is number _____.

This transformation is a reflection. OR This transformation is a translation.

The line of reflection is _____.

The image is to the left / right of the pre-image.

The image is connected / not connected to the pre-image.

The image is at the same level / below the pre-image.

Point _____ is taken to point _____.

Word bank						
English	corresponding	image	line	point	reflect	translate
Español	correspondiente	imagen	línea	punto	reflejar	trasladar

Name: Date: Period:

Equilateral Images

Write your second draft stronger and clearer.

When describing a rotation, it is important to state the center of rotation, the direction of rotation, and the angle of rotation.

Did I tell my partner what the *center of rotation* is?

Did I tell my partner in which direction the rotation is going?

Did I tell my partner the angle of rotation?

Helpful phrases (Frases útiles)	
English	Español
angle of rotation	ángulo de rotación
center of rotation	centro de rotación
clockwise rotation	rotación en el sentido de las manecillas del reloj
counterclockwise rotation	rotación en sentido contrario a las manecillas del reloj
direction of rotation	dirección de rotación

Name: _____ Date: _____ Period: _____

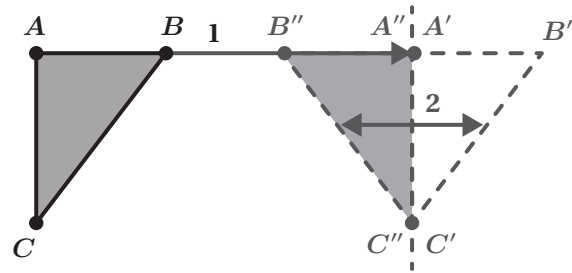
Sequences of Transformations

The first thing I did to $\triangle ABC$ was . . .

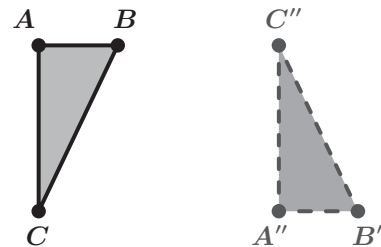
The second thing I did to $\triangle ABC$ was . . .

Word bank	
English	Español
angle	ángulo
center	centro
clockwise	en el sentido de las manecillas del reloj
counterclockwise	en el sentido contrario a las manecillas del reloj
direction	dirección
point	punto
reflect	reflejar
rotate	rotar
translate	trasladar

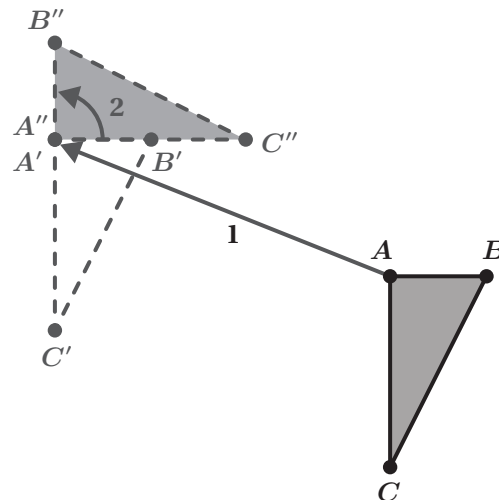
Transformation Challenge #1



Transformation Challenge #2



Transformation Challenge #3



Name: _____ Date: _____ Period: _____

Pattern Play

Use these sentence frames as you discuss and explain the geometric pattern found in the Tomb of I'timād-ud-Daulah.

Description

In the center of the design, I see . . .

To get the center part to repeat, I could. . .

To get the pattern around the center star, I could. . .

reflect / reflejar

rotate / girar

transformation / transformación

translate / trasladar

How it is similar to constructions I've done

This is made of _____ and _____ just like constructions that I've done.

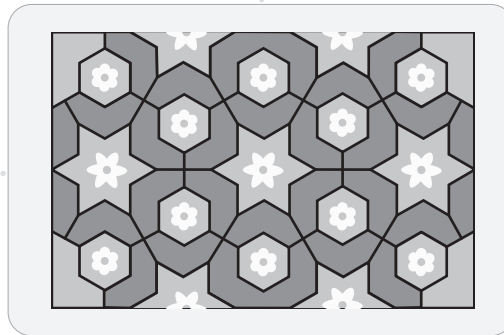
circles / círculos

intersecting / intersectando

lines / líneas

parallel / paralelo

points / puntos



This design has more _____ than anything I've done before.

circles / círculos

intersecting / intersectando

lines / líneas

parallel / paralelo

points / puntos

symmetry / simetría

To recreate this pattern, _____ could be used to. . . (Repeat as needed)

reflect / reflejar

rotate / rotar

transformation / transformación

translate / trasladar

How it is different from constructions I've done

How transformations could be used to recreate the pattern

Name: _____ Date: _____ Period: _____

Self-Reflection in Polygons

The / Each line of symmetry is a line segment that . . .

The / Each line of symmetry connects . . .

The / Each line of symmetry intersects . . .

There are no lines of symmetry because . . .

A line segment that _____ is a non-example because . . .

Word bank	
English	Español
angle	ángulo
base	base
bisector	bisectriz
congruent	congruente
connect	conectar
intersect	intersecarse
line of symmetry	línea de simetría
line segment	segmento de línea
midpoint	punto medio
opposite	opuesto
parallel	paralelo
perpendicular	perpendicular
side	lado
vertices	vértices

Name: _____ Date: _____ Period: _____

Self-Rotation

The shape has / does not have rotational symmetry because . . .

A rotation of _____ ° around _____ in a _____ direction will / will not take the shape onto itself.

A rotation that _____ can / cannot take the shape onto itself because . . .

When point _____ goes to point _____ by a rotation, the shape will / will not be taken onto itself.

A non-example is a rotation that _____ because . . .

Word bank			
English	Español	English	Español
angle	ángulo	rectangle	rectángulo
around	alrededor	rotate	rotar
center	centro	rotation	rotación
clockwise	en el sentido de las manecillas del reloj	side	lado
congruent	congruente	symmetry	simetría
counterclockwise	en el sentido contrario a las manecillas del reloj	tracing paper	papel de calco
degrees	grados	trapezoid	trapecio
direction	dirección	triangle	triángulo
parallelogram	paralelogramo	vertex	vértice
point	punto		

Name: _____ Date: _____ Period: _____

What Does It Do?

1. Decide whether Cho's and Mia's statements are correct or incorrect.
2. Justify your thinking. Use pictures, diagrams, words, and/or numbers to support your thinking.
3. Be prepared to defend your position.

<p>I think Cho's statement is correct / incorrect.</p>	<p>The statement does / does not make sense because . . .</p>
<p>I think Mia's statement is correct / incorrect.</p>	<p>The statement does / does not make sense because . . .</p>
<p>I am not sure. I have questions about Cho's or Mia's statement.</p>	<p>My question is . . .</p>

Name: _____ Date: _____ Period: _____

If We Know This, Then We Know That...

Segment BC and Segment EF are congruent because . . .

Segment BC and Segment EF can be _____ which means _____.

Angle ABC and Angle DEF are congruent because . . .

Angle ABC and Angle DEF can be _____ which means _____.

Yes / No, because . . .

Since the figures are congruent, then _____ because _____.



Discuss:

Your explanation tells me . . .

Is it always true that . . .?

Can you say more about why . . .

That could be true because . . .

A detail (or word) you could add
is _____, because . . .

That could not be true because . . .

Name: _____ Date: _____ Period: _____

Congruent Polygons

When I can look at the _____, I notice _____.

I think side / angle _____ matches up with side / angle _____ because . . .

The angles are congruent because . . .

The angles are not congruent because . . .

When I look at the congruence statement, I notice _____.

The statement is true / false because when you translate / rotate / reflect polygon _____ I see _____.

In the diagram, side / angle _____ matches up with side / angle _____ which means the statement is true / false because . . .

Word bank			
English	Español	English	Español
angle	ángulo	polygon's name	nombre del polígono
congruence statement	declaración de congruencia	position	posición
correspond	corresponder	segment	segmento
order	orden	vertices	vértices

Name: _____ Date: _____ Period: _____

Why Do They Coincide?

1. Write a first draft.

- Points _____ and _____ have to be in the exact same place because . . .
- _____ is congruent to _____ because _____.
- Since _____ and _____ are congruent, I know _____.
- By the definition of a translation/rotation/reflection, I know _____.

2. Meet with a partner to discuss your first draft.

- How do you know that _____?
- What do you mean when you say _____?
- Could you use a different word for _____?

3. Write a second draft that is stronger and clearer.

Word bank	
English	Español
angle	ángulo
coincide	coincidir
congruent	congruente
corresponding	correspondiente
distance	distancia
length	longitud
measure	medida
ray	rayo
reflection	reflexión
rigid transformation	transformación rígida
rotation	rotación
point	punto
preserve	preservar
side	lado
translation	traslación

Name: _____ Date: _____ Period: _____

Create It!

After you read your problem, record the information you already know. Determine which piece of missing information you want to ask for from your support partner. Record the information your partner gives you then complete the triangle.

Problem # _____

Angle Measures	Side Lengths
Angle A is _____ degrees.	Segment AB is _____ cm.
Angle B is _____ degrees.	Segment AC is _____ cm.
Angle C is _____ degrees.	Segment BC is _____ cm.

Problem 1:

Problem 2:

Problem # _____

Angle Measures	Side Lengths
Angle A is _____ degrees.	Segment AB is _____ cm.
Angle B is _____ degrees.	Segment AC is _____ cm.
Angle C is _____ degrees.	Segment BC is _____ cm.

Name: Date: Period:

Create It! (continued)

Problem 3:

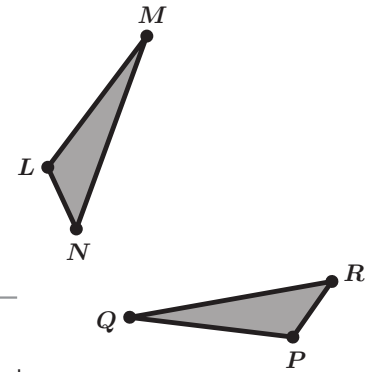
Problem 4:

Word bank						
English	angle	congruent	corresponding	degrees	length	segment
Español	ángulo	congruente	correspondiente	grados	longitud	segmento

Name: _____ Date: _____ Period: _____

Side-Angle-Side Triangle Congruence

Use these sentence stems to assist you as you think about triangle LMN and triangle PQR .



Describe a sequence of rigid transformations that takes $\triangle LMN$ onto $\triangle PQR$.

- First step: Translate $\triangle LMN$ so that point _____ is taken to point _____ on $\triangle PQR$. (Now sketch and label the translated triangle as $\triangle LMN$.)
- Next step: Rotate $\triangle LMN$ in a _____ direction around point _____ by angle _____ so that the two triangles coincide.

What do you know about the relationship between sides MN and QR ?

- Because there is a sequence of rigid transformations that takes $\triangle LMN$ directly onto $\triangle PQR$, the two triangles are _____.
- This means sides MN and QR are _____ because those are . . .

What do you know about the relationship between angle M and angle Q ?

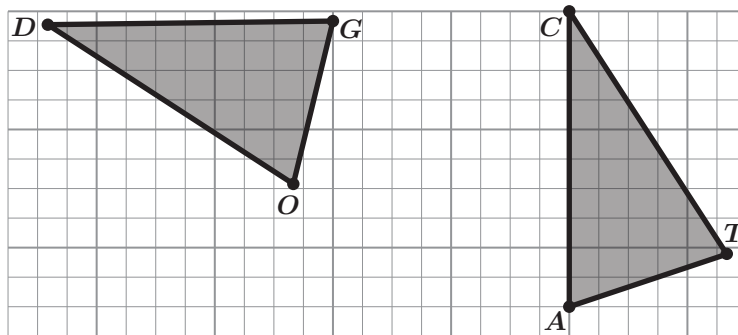
- Because $\triangle LMN$ is congruent to $\triangle PQR$, angle M is congruent to _____ because . . .

Word bank			
English	Español	English	Español
clockwise	en el sentido de las manecillas del reloj	counterclockwise	en sentido contrario a las manecillas del reloj
angle	ángulo	side	lado
congruent	congruente	similar	semejante
corresponding	correspondiente		

Name: _____ Date: _____ Period: _____

Three Sides to Every Story?

Use these sentence stems to assist you as you think about triangle CAT and triangle DOG .



Describe a sequence of rigid transformations that takes $\triangle CAT$ onto $\triangle DOG$.

- First step: Translate $\triangle CAT$ so that point _____ is taken to point _____ on $\triangle DOG$. (Now sketch and label the translated triangle as $\triangle C'A'T'$.)
- Next step: Rotate $\triangle C'A'T'$ in a _____ direction around point _____ by angle _____ so that the two triangles coincide.

What must be true about $\triangle CAT$ onto $\triangle DOG$?

What do you know about the relationship between angle C and angle D ?

- Angle C and angle D are _____ because they are _____.

What other relationships between exist between $\triangle CAT$ onto $\triangle DOG$?

When three sides of one triangle are congruent to three sides of another triangle, will the two triangles always be congruent?

Word bank			
English	Español	English	Español
clockwise	en el sentido de las manecillas del reloj	counterclockwise	en sentido contrario a las manecillas del reloj
angle	ángulo	corresponding	correspondiente
coincide	coincidir	side	lado
congruent	congruente		

Name: Date: Period:

Words With Multiple Meanings

Draw a picture or write in words to show the meaning of the term *association* that is used in this unit and another meaning of the term.

Math meaning(s)	
<p>Description</p>	<p>Example</p>
<div style="border: 1px solid gray; border-radius: 15px; padding: 10px; display: inline-block;"> <u>association</u> </div>	
<p>Description</p>	<p>Example</p>
Another meaning	

Math Habits of Mind: Hábitos mentales matemáticos

I can slow down and first make sense of a challenging problem before trying to solve it.

Puedo ir más despacio y primero comprender un problema difícil antes de intentar resolverlo.

I can represent real-world problems and interpret their solutions within the context of the problem.

Puedo representar problemas del mundo real e interpretar sus soluciones dentro del contexto del problema.

I can justify my thinking and ask questions to help me understand the thinking of others.

Puedo justificar mi razonamiento y hacer preguntas que me ayuden a comprender el razonamiento de los demás.

I can apply the math that I know to solve real-world problems, make assumptions and revise my thinking as needed.

Puedo poner en práctica mis conocimientos matemáticos para resolver problemas del mundo real, formular hipótesis y modificar mi razonamiento según sea necesario.

I can select an appropriate tool to help me solve problems.

Puedo seleccionar una herramienta adecuada que me ayude a resolver problemas.

I can communicate my thinking and solutions clearly to others.

Puedo comunicar mi razonamiento y soluciones claramente a los demás.

I can look for structure or patterns to help me solve problems.

Puedo buscar estructuras o patrones que me ayuden a resolver problemas.

I can look for repeated calculations and other repeated steps to make generalizations.

Puedo buscar cálculos y otros pasos repetidos para hacer generalizaciones.

Name: Date: Period:

Questions and Sentence Frames

Why did you choose this habit of mind?

Did you choose any others? Why or why not?

What part of the Activity reminded you of this habit of mind?

Can you tell me more?

I chose this habit of mind because . . .

I also chose _____ because . . .

In the Activity, I . . .

Name: _____ Date: _____ Period: _____

Types of Data

1. Listen to your classmate's statement about the type of data that the question "Do you live within 2 miles of a grocery store?" would produce. Think about it! Does their response make sense mathematically?
2. Choose your position and decide whether you agree with their statement, disagree with their statement, or have questions about their statement.
3. Show or describe your thinking in writing. Use pictures, diagrams, words, and/or numbers to support your thinking.
4. Be prepared to defend your position.

I agree with my classmate's statement.	The statement makes sense mathematically because . . .
I disagree with my classmate's statement.	The statement does not make sense mathematically because . . .
I am not sure. I have questions about my classmate's statement.	My question is . . .

Name: _____ Date: _____ Period: _____

Hearing Loss and Age

6. Adhira says: Out of all the people who are over the age of 18 in Metropolis, about 19% of them already have hearing loss, so the trains aren't going to make a big difference.

Do you agree or disagree with Adhira? Explain your thinking.

I agree / disagree with Adhira because . . .

7. Based on this data, do you think there is an association between the city that people live in and hearing loss? Circle one.

Yes or No

Explain your thinking.

There *is* / *is not* an association between city and hearing loss because . . .

8. Should this data cause the people of Metropolis to act?

I think this data _____ cause people to act because . . .
(will / will not)

9. Hearing loss is one impact that trains might have on the population of Metropolis.

What are some other impacts that trains might have on the population of Metropolis?

The trains could impact . . .

Another impact the trains could have is . . .

Word bank			
English	Español	English	Español
city	ciudad	property value	valor de la propiedad
community	comunidad	residents	residentes
hearing loss	pérdida de audición	train	tren
impact	impacto	variables	variables
people	gente	wildlife	vida silvestre

Name: _____ Date: _____ Period: _____

Closing Arguments

One middle schooler and one high schooler decided to talk to the principal about what the school should choose.

Kayleen (a middle schooler) said: *The school should build a basketball court because it's the most popular across the whole school.*

Mariam (a high schooler) said: *High school students have been here the longest, and we think a picnic area would benefit the entire school the most.*

Write: Use these sentence frames to create a first draft written response.

- 13.** Imagine you want to convince the principal which choice the school should make. Write an argument using data, reasoning, and your personal preference about what choice the school should make.

I would choose _____ because _____.

Based on _____, this would be a great choice.

Plus, I think _____

- 14.** What is a decision that your school is trying to make? How might a two-way frequency table help you make this decision?

My school is trying to decide _____.

A two-way frequency table might be helpful because _____.



Discuss: Use these sentence frames as you talk with your partner to create a stronger and clearer second draft.

Your explanation tells me . . .

Is it always true that . . . ?


Can you say more about why . . .

That could be true because . . .

A detail (or word) you could add is _____,
because . . .

That could not be true because . . .

Histograms

 **Directions:** Make copies and pre-cut. Give each student the appropriate leveled support.
Note: The top portion offers emerging language supports, the middle portion offers expanding language supports, and the bottom portion offers bridging language supports.

8. What is true about Kwame's claim? What is misleading?

It is true that a bin width _____ all ratings.

It is misleading that people _____ the dentist equally.

8. What is true about Kwame's claim? What is misleading?

It is true that a bin width _____ all ratings. The ratings are _____ into equal _____.

It is misleading that people _____ the dentist equally because if you change the bin width _____.

Word bank							
English	bin width	data	split	halves	ratings	fifths	tenths
Español	ancho del contenedor	datos	dividirse	mitades	calificaciones	quintos	decenas

8. What is true about Kwame's claim? What is misleading?

It is true that _____.


It is misleading that _____.

Name: _____ Date: _____ Period: _____

Comparing

5. Here is a dot plot and a box plot for the number of rainy days for each month in Charleston in 2021.

Bao says: *In half of the months of the year, Charleston had at least 6 rainy days.*

a  **Discuss:** How can the box plot help you know that Bao's statement is true?

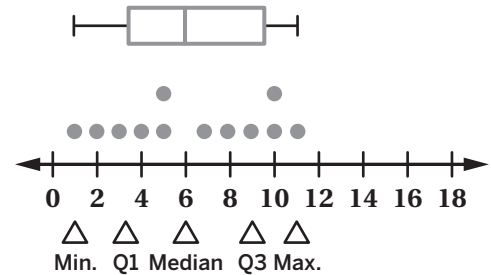
Bao's statement is true because . . .

b Write *two* more true statements that can be determined from the dot plot or box plot.

The box plot tells us . . .

Based on the dot plot, the rainiest month . . .

Number of Rainy Days Each Month (Charleston 2021)



6. Here are two box plots showing the number of rainy days for each month in Seattle and Charleston in 2021.

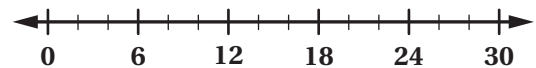
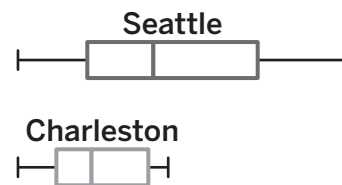
Use the box plots to help Bao convince Mia that Seattle is the rainier city.

Seattle is the rainier city because . . .

In Seattle . . .

In Charleston . . .

Number of Rainy Days Each Month (2021)



Word bank

English	Español	English	Español
minimum	mínimo	less than	menor que
maximum	máximo	more	más
median	mediana	less	menos
mean	medio	rainy	lluvioso
greater than	mayor que	days	días

Name: _____ Date: _____ Period: _____

Polygraph

Is it _____?

Does it have _____?

Are there more on the _____?

Is the graph _____?

Are the ends _____?

Is there a _____?

Is the _____?

Does it look like _____?

Word bank			
English	Español	English	Español
bell-shaped	en forma de campana	minimum	mínimo
bimodal	bimodal	shape	forma
maximum	máximo	skewed	asimétrico
mean	medio	symmetric	simétrico
median	mediana	uniform	uniforme

Name: _____ Date: _____ Period: _____

Measures of Center

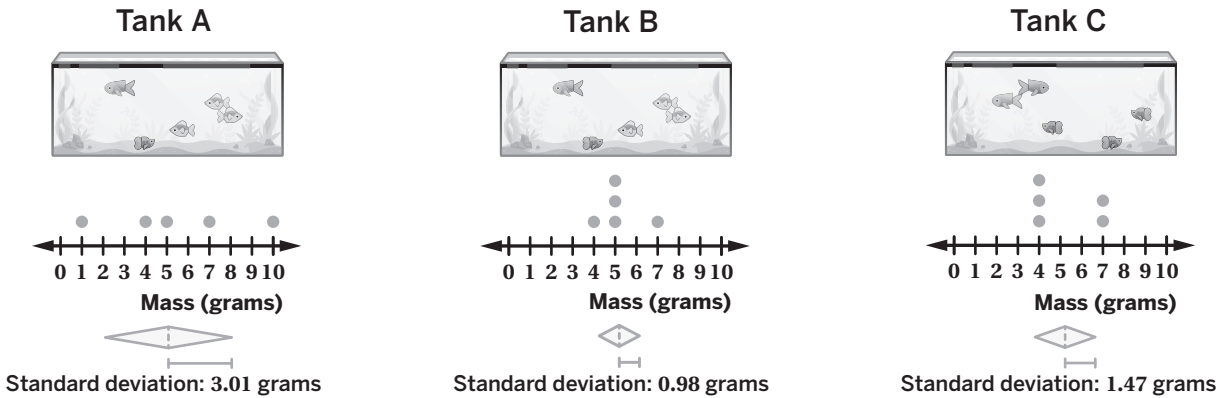
1. Listen to your classmate's statement about the measure of center. Think about it! Does their response make sense mathematically?
2. Choose your position and decide whether you agree with their statement, disagree with their statement, or have questions about their statement.
3. Show or describe your thinking in writing. Use pictures, diagrams, words, and/or numbers to support your thinking.
4. Be prepared to defend your position.

<p>I agree with my classmate's statement.</p>	<p>The statement makes sense mathematically because . . .</p>
<p>I disagree with my classmate's statement.</p>	<p>The statement does not make sense mathematically because . . .</p>
<p>I am not sure. I have questions about my classmate's statement.</p>	<p>My question is . . .</p>

Name: _____ Date: _____ Period: _____

Introduction to Standard Deviation

4. One way to determine the consistency of data is to calculate the **standard deviation**, which is a **measure of spread**. Here are three different fish tanks.



Explain what you think standard deviation measures.

In Tank A, the standard deviation is _____. The dot plot shows . . .

In Tank B, the standard deviation is _____. The dot plot shows . . .

In Tank C, the standard deviation is _____. The dot plot shows . . .

When the standard deviation is small, the dot plot values . . .

When the standard deviation is large, the dot plot values . . .

I think the standard deviation measures _____
because . . .

Word bank			
English	Español	English	Español
apart	separado	small	pequeño
close	cerca	spread	dispersión
data	datos	standard deviation	desviación estándar
dot plot	diagrama de puntos	values	valores
large	grande	weight	peso

Name: _____ Date: _____ Period: _____

Portland vs. Phoenix

I think _____ is hotter because the _____ tells me _____.

In my opinion, _____.

I noticed _____, so I think _____ is hotter.

It looks like . . .

I know because . . .

The _____ suggests that the temperature in _____ is _____.

Word bank			
English	Español	English	Español
maximum	máximo	standard deviation	desviación estándar
mean	media	statistic	estadística
median	mediano	temperature	temperatura
minimum	mínimo		

Name: _____ Date: _____ Period: _____

Which Statistic?

1. Listen to your classmate's statement about who they would give the Best Overall Car award to. Think about it! Does it make sense mathematically?
2. Choose your position and decide whether you agree with the statement, disagree with the statement, or have questions about the statement.
3. Show or describe your thinking in writing. Use pictures, diagrams, words, and/or numbers to support your thinking.
4. Be prepared to defend your position.

<p>I agree with my classmate's statement.</p>	<p>The statement makes sense mathematically because . . .</p>
<p>I disagree with my classmate's statement.</p>	<p>The statement does not make sense mathematically because . . .</p>
<p>I am not sure. I have questions about my classmate's statement.</p>	<p>My question is . . .</p>

Name: _____ Date: _____ Period: _____

Outliers and Their Effects

1. Listen to your classmate's statement about whether you should use the mean for the typical score. Think about it! Does it make sense mathematically?
2. Choose your position and decide whether you agree with the statement, disagree with the statement, or have questions about the statement.
3. Show or describe your thinking in writing. Use pictures, diagrams, words, and/or numbers to support your thinking.
4. Be prepared to defend your position.

I agree with my classmate's statement.	The statement makes sense mathematically because . . .
I disagree with my classmate's statement.	The statement does not make sense mathematically because . . .
I am not sure. I have questions about my classmate's statement.	My question is . . .

Name: _____ Date: _____ Period: _____

Minimum Wages

Use this Sheet as a support when working on Activity 1, Problems 6 and 7 in your Student Edition.

6. Help Omari answer: *How has the minimum wage in the United States changed over time?*
Use statistics about center and spread to support your ideas.

The minimum wage in the United States has _____ from 2010 to 2024 because . . .

The minimum wages in 2024 are _____ spread out because . . .

Since 2010, the median minimum wage . . .

Since 2010, the IQR of the minimum wage . . .

Since 2010, the mean minimum wage . . .

Since 2010, the standard deviation of the minimum wage . . .

7.  **Discuss:** Did the minimum wage change in the ways you expected or were you surprised?

A statistic that changed was _____, which means _____.

I was surprised that . . .

Word bank			
English	Español	English	Español
increased	aumentado	spread	dispersión
decreased	disminuido	minimum	mínimo
smaller	mas pequeño	maximum	máximo
larger	más grande		

Name: _____ Date: _____ Period: _____

The r -value

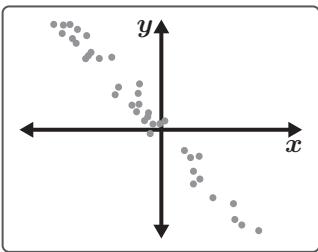
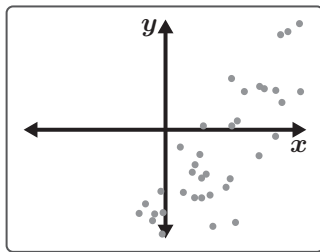
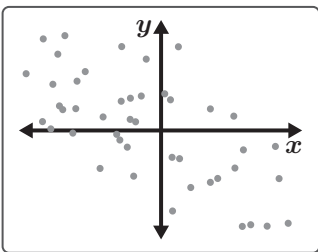
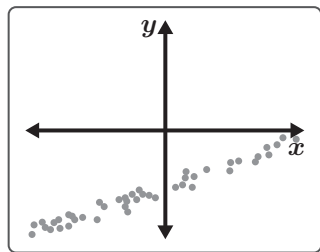
5. The r -value is a number that measures the strength and direction of a linear association.

a. What do you notice and wonder about the r -value?

I notice . . .

I wonder . . .

6. Match each scatter plot to its r -value. Then use the words from the word bank to describe the strength and direction of each scatter plot.

-0.99	-0.65	0.86	0.99
			
			

Word bank				
English	negative	positive	strong	weak
Español	negativo	positivo	fuerte	débil

Name: _____ Date: _____ Period: _____

Including Income

Use this Sheet to support you as you complete Screens 7 and 8 in Activity 2.

7. Laila wonders: *Is there an association between income and tree cover?*

- a** Make a prediction: What kind of association do you expect between these variables? (e.g., weak positive or strong negative.)

I think there will be a _____ association because . . .

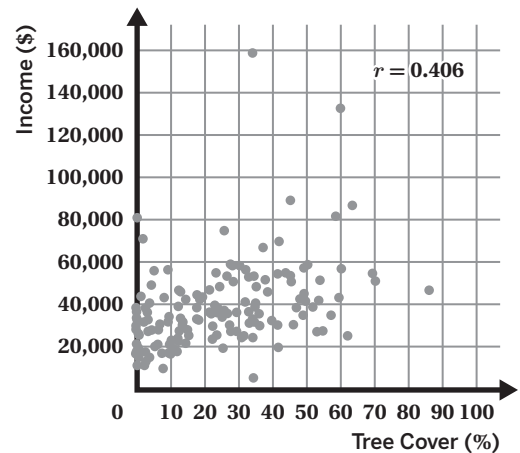
- b** Let's look at the data.  **Discuss:** Was your prediction correct?

My prediction was _____ because . . .
(correct / incorrect)

8. This graph shows the average income and the percentage of tree cover for 150 blocks in Philadelphia.

What does the r -value say about the association between income and tree cover?

It looks like there is a _____ association between income and tree cover.



Word bank

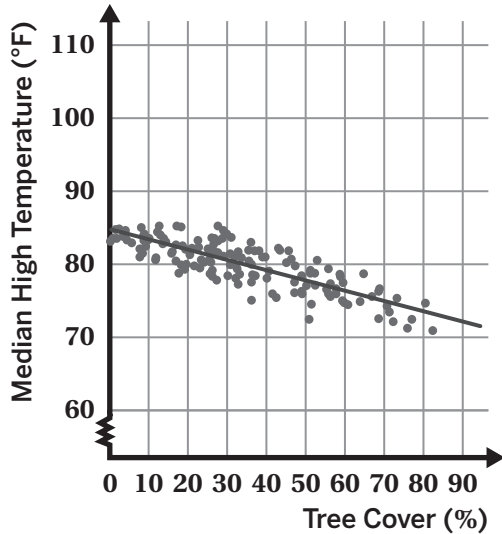
Word bank				
English	weak	strong	negative	positive
Español	débil	fuerte	negativo	positivo

Name: _____ Date: _____ Period: _____

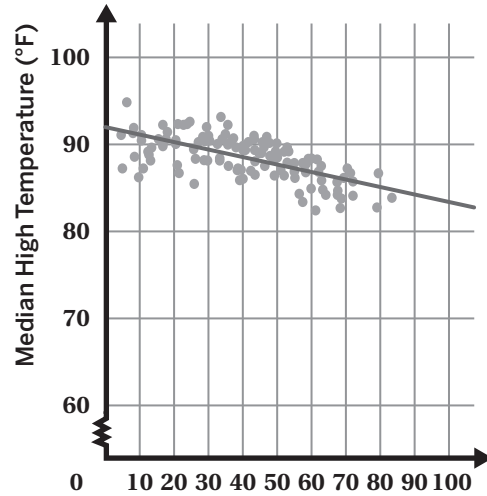
Interpreting in Context

What do the slope and y -intercept mean about the relationship between temperature and tree cover for each city?

Detroit: $y = -0.14x + 84.58$



Austin: $y = -0.08x + 92.07$



-0.14 means that . . .

As the tree cover _____, the median temperature _____.

84.58 would be the . . .

If there was _____ tree cover then _____.

Word bank

English	Español
decrease	disminuir
increase	aumentar
less	menos
median high temperature	temperatura media alta
more	más
tree cover	cubierta arbórea

Name: Date: Period:

Residual Plots

When the line fits the data well, the points on the residual plot are . . .

When the line doesn't fit the data well, the points on the residual plot are...

Word bank	
English	Español
above	arriba
below	debajo
close	cerca
far	lejos
line	línea
point	punto

I agree/disagree because . . .

Why do you think . . . ?

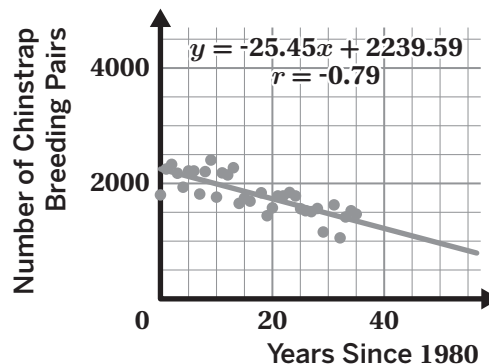
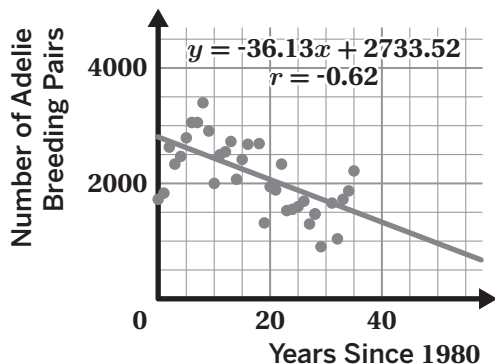
How do you know . . . ?

I see your point, but . . .

Name: _____ Date: _____ Period: _____

Generating a Line of Best Fit

Compare the data of these two penguin populations.



Write: How are they alike? How are they different? Consider adding more to each category than what is provided in each category.

Alike	Different
Both populations are . . .	The data are different because . . .
They both started with . . .	The relationship between population and time is different because . . .
Both of the r -values and slopes are . . .	According to the line of best fit, . . .



Discuss:

- Where do you see . . . ?
- Can you show me how . . . ?
- What makes you think . . . ?
- How does that compare to . . . ?
- What I am hearing you say is . . . Is that right?
- I want to add that . . .
- In this case . . .

Name: _____ Date: _____ Period: _____

Correlation, Yes. But Causation?

1. Read aloud the two headlines for the given data and think about which headline you believe is more accurate. Which one makes more sense?
2. Choose which headline you think is more accurate, or if you have questions about the headlines.
3. Show or describe your thinking in writing. Use pictures, diagrams, words, and/or numbers to support your thinking.
4. Be prepared to defend your position.

<p>I think headline A is more accurate.</p>	<p>Headline A is more accurate because . . .</p>
<p>I think headline B is more accurate.</p>	<p>Headline B is more accurate because . . .</p>
<p>I am not sure. I have questions about the two headlines.</p>	<p>My question is . . .</p>

Interview a Classmate

Step 1: Select and Ask Your Question

- A. What variables did you choose? What about those variables is interesting?
- B. What relationship did you see? What statistics support that?
- C. Were the results what you expected or were you surprised?
- D. Do you think one of your variables causes the other? Are there other variables that might be affecting this relationship?
- E. How might your city or town use the information about the relationship you studied?
- F. What other questions do you have about the data?

Step 2: Listen and Take Notes

Interview Process

- A. I chose the variable _____.
This variable was interesting because _____.
- B. The relationship I saw was _____.
The statistic that supports this is _____.
- C. I expected _____.
I was surprised that _____.
- D. I think _____.
- E. I think my city _____.
- F. What does _____?
How does _____?

- How do you know . . . ?
- Why do you think . . . ?
- What happened between _____ and _____?
- Is it always true that . . . ?
- How did you get . . . ?

Step 3: Share your response

Step 4: Ask other questions or comments to continue conversation.