Quadratics Tasks

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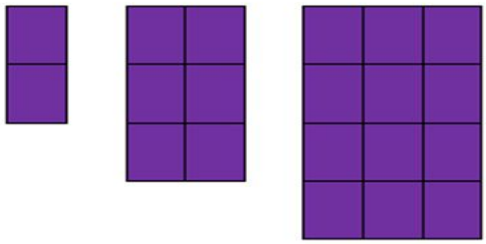
Visual Patterns Activity Name _____ Date _____



x	f(x)
0	
1	
2	
3	
4	
5	
6	

1. Show the 4th and 5th set of the pattern in the table, (Drawing optional)

2. How many would be in the 10th set?

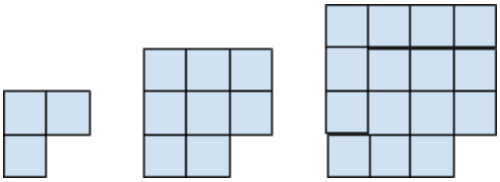
3. How much would be in the 0th set?

4. Describe the pattern *recursively* in your own words.
   (i.e. What are you doing *each time* to the *next pattern*?)

5. Describe the pattern *explicitly* in your own words.
   (i.e. What can you do to the *pattern number* to find the total for that pattern?)

Interesting Visual Patterns

A



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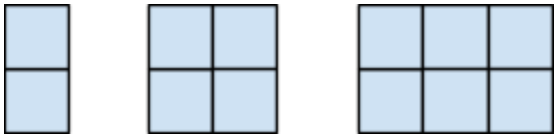

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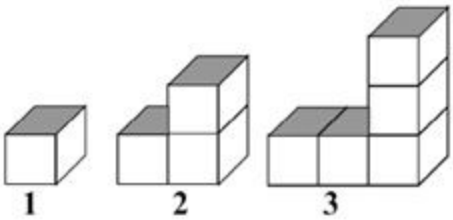

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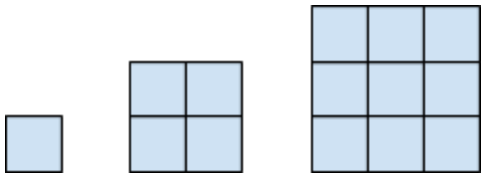
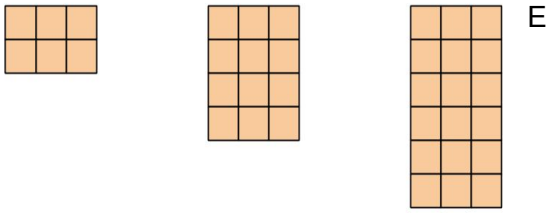
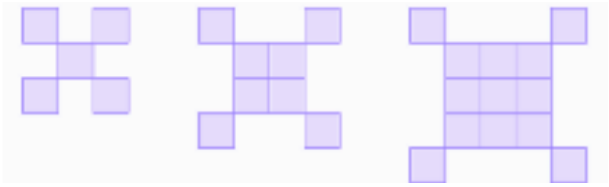


E



F



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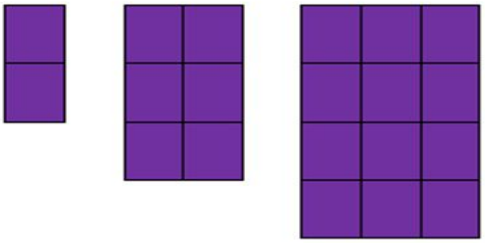
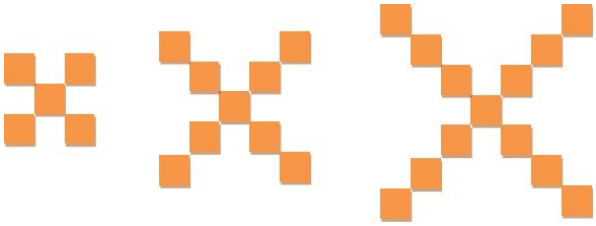


H



Patterns to Equations Name _____ Date _____

First: Look at the following sets of number patterns and find the next two numbers in the sequence.

1. 3, 8, 15, 24, _____, _____
2. 2, 4, 6, 8, _____, _____
3. 1, 4, 9, 16, _____, _____
4. 20, 28, 36, 44, _____, _____
5. 8, 14, 22, 32, _____, _____
6. 6, 12, 18, 24, _____, _____

Second: Look at each of the patterns and find the ones that grow in a similar manner.

Which Patterns are similar? Why? _____

_____

Check with your neighbor to see if you have the same patterns.

Third: Compare the visual patterns on the board to these. Which ones match the patterns above?

1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____

What do the growing shapes have in common? _____

_____

Fourth: All of the patterns can be either linear or quadratic. These types of patterns are significant so let's write down their definition and what we know about their functions:

Linear pattern _____

_____

Quadratic pattern _____

_____

Fifth: Which of the numbers from above were Quadratic? _____ Linear? _____

Sixth: With your partner, create a linear and a quadratic function, you can draw a visual pattern, or just create a sequence of numbers. and then use a table to demonstrate that it is linear or quadratic.

Pattern A.

Linear or Quadratic?

x	f(x)
1	
2	
3	
4	
5	

Pattern B.

Linear or Quadratic?

x	g(x)
1	
2	
3	
4	
5	

Now find two more patterns from someone else in class and write them below:

Pattern C.

Linear or Quadratic?

x	h(x)
1	
2	
3	
4	
5	

Pattern D.

Linear or Quadratic?

Washing Dishes Name _____ Date _____

Carl is working saturdays as a dishwasher at the restaurant “Ticonderoga”. The salary for the job is $7.50 per hour, but waiters at “Ticonderoga” give dishwashers a portion of their tips each hour. Waiters give many tips when the restaurant first opens but they give more when it’s busier at the end of the night. His boss said waiters will $2 Dollars of tips after the first hour of a shift, then $4 Dollars of tips after the second hour, then $6 Dollars, $8 Dollars, and so on as the restaurant gets busier.

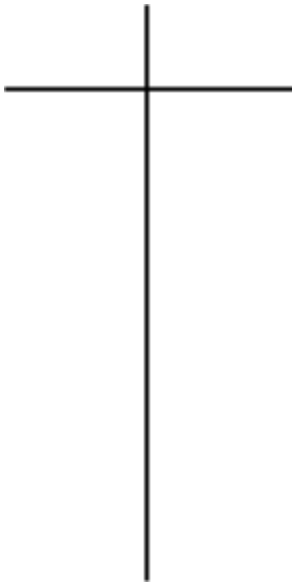
How much would he expect to get paid during the 3rd hour of a saturday shift?

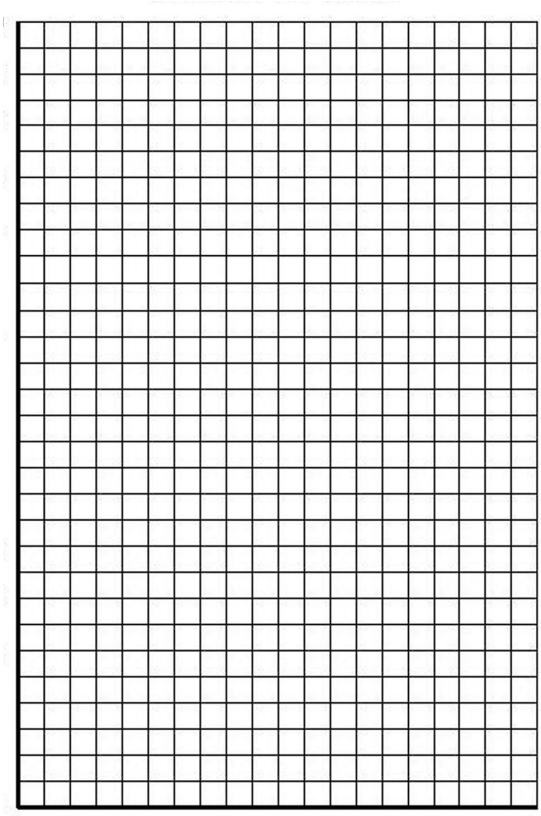
Explain how you know:

_____

_____

Use a table and a graph to display how much he would make **per hour** during the 1st, 2nd, 3rd, 4th, and 5th hours?





What kind of function is the relationship between hours and pay rate? Can you make an equation for it?

_____

_____

Washing Dishes Cont'd

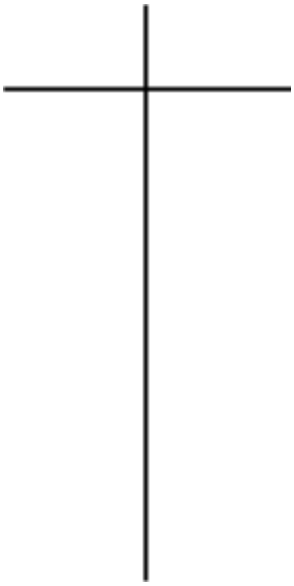
Now it's Saturday and he is excited to start getting the money he needs to buy chipotle, get his little sister the new Call of Duty game, and buy a new ipad. Unfortunately his boss still hasn't told him how long he is going to be working. It could be 1 hour or it could be 10 hours. He also has to pay $24 out of his check for his uniform

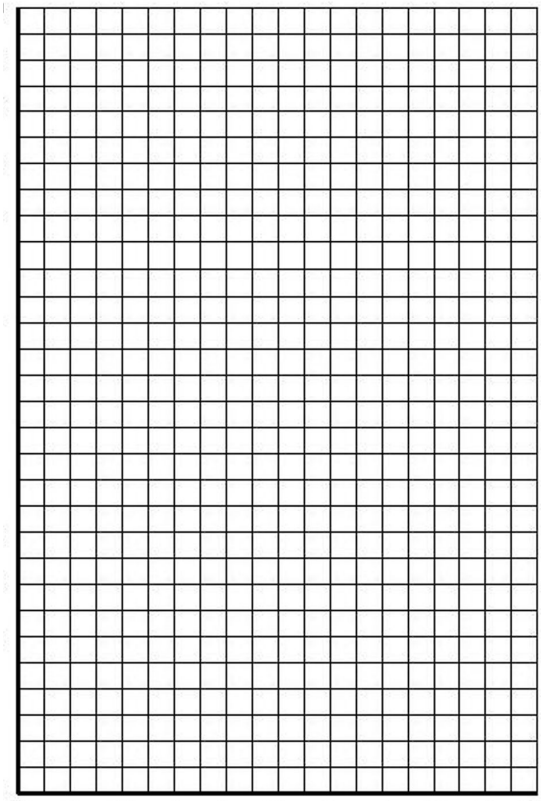
What would his final pay be if he is sent home after the 3rd hour that he works? Explain how you know:

_____

_____

Use a table and a graph to display how much **total** he would make for the 1st, 2nd, 3rd, 4th, and 5th hours?





What kind of function is this? Make the function below and explain how you know

_____

_____

How many hours should he work in order to have enough money for chipotle?, Call of Duty?, an ipad?

_____

_____

Connections in the Vertex Formula Name _____ Date _____

Looking at each of the following tables, find the vertex and the second difference, then see if you can find an equation that works. Remember the Quadratic Equation form we're using is: $\mathbf{y = a(x - h)^2 + k}$

x	f(x)	1st diff	2nd diff
-3	22		
-2	15		
-1	10		
0	7		
1	6		
2	7		
3	10		

What is the vertex? x: _____ y:_____ The 2nd Diff? _____

Using the information, what is a vertex form equation for this table?

Y = _____

Explain how you know: _____

_____

_____

_____

x	f(x)	1st diff	2nd diff
-3	15		
-2	5		
-1	-1		
0	-3		
1	-1		
2	5		
3	15		

What is the vertex? x: _____ y:_____ The 2nd Diff? _____

Using the information, what is a vertex form equation for this table?

Y = _____

Explain how you know: _____

_____

_____

_____

x	f(x)	1st diff	2nd diff
-3	-1		
-2	5		
-1	7		
0	5		
1	-1		
2	-11		
3	-25		

What is the vertex? x: _____ y:_____ The 2nd Diff? _____

Using the information, what is a vertex form equation for this table?

Y = _____

Explain how you know: _____

_____

_____

_____