

1. For each growing visual pattern:
 - a. What is changing?
 - b. What is growing?
 - c. Draw what comes next?
 - d. Create a table of values that represents the information.
 - e. What will the 10th term be?

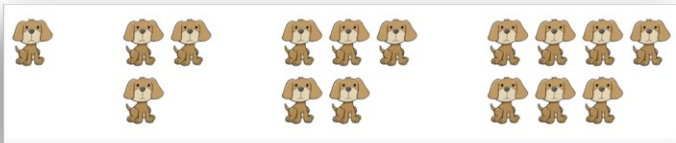


Figure 1



Figure 2



Figure 3



Figure 4

2. Draw a line from the pattern to the formula to match each pattern with its composite general rule.

2,3,4,5, ...	$4n + 2$
34, 33, 32, 31, ...	$n + 1$
6, 10, 14, 18, ...	$35 - 1$

There are two types of pattern rules:

Recursive: rules that tell you how to determine each term from the previous terms.

Composite: rules that tell you how to make the sequence directly from the term number.

An algebraic expression is used to represent the pattern

3. Which type of rule is this? Start at 6 and add 2 each time to create a sequence.

a. Create the sequence.

b. Write a composite general rule for making the sequence directly from the term number.

4. Write both types of rules (recursive and composite) for each sequence.

a. 98, 85, 72, 59, ...

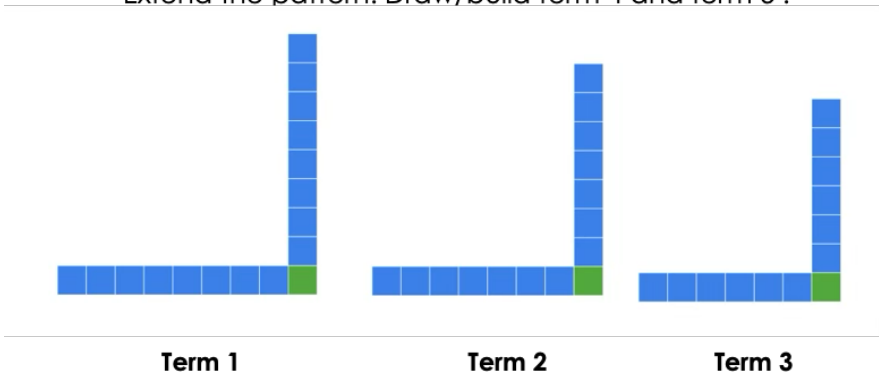
b. 7, 13, 19, 25, ...

c. 3, 6, 9, 12, ...

Exploring the L-Pattern

How do you see the pattern growing?

Extend the pattern. Draw/build term 4 and term 5 .



Create a T-Chart that represents the pattern.

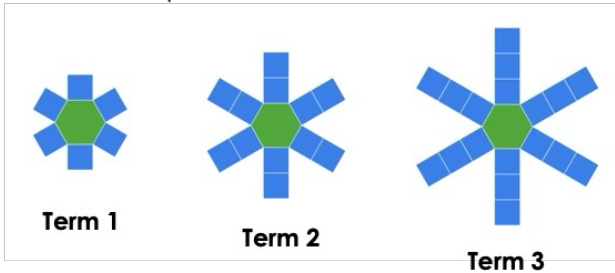
Term Number	Total Number of Pieces
1	
2	
3	
4	
5	
6	
7	

What is the general rule for this pattern? How do you know?

Exploring the Hexagonal Sun Pattern

How do you see the pattern growing?

Extend the pattern. Draw/build term 4 and term 5.



Term 4

Term 5

Create a T-Chart that represents the pattern.

Term Number	Total Number of Pieces
1	
2	
3	
4	
5	
6	
7	

What is the general rule for this hexagonal sun pattern? How do you know?

5. One flowerpot costs \$47.

a. How much does it cost to buy 2 flowerpots? 3 Flowerpots?

b. Make a table of values to represent the number of flowerpots and cost.

c. Use the pattern to predict the cost of 20 flowerpots.

d. Write a pattern rule for the cost and use it to determine what the cost of 150 flowerpots would be.

6. A certain marigold variety can grow up to 240 cm tall. It grows 20 cm each week, starting at 0 cm when it first appears.

a. In which week will the marigold first reach 240 cm? Explain your reasoning.

b. How tall will the marigold be at the end of Week 7?

c. Make a table showing, *Week Number* and *Height (cm)*. What kind of pattern is this?

7. What Is the Same? What Is Different?

Sequence A: 2, 5, 8, 11, 14...

Sequence B: 20, 17, 14, 11, 8...

Describe what's the same about these two sequences and what's different. Justify your thinking using math. For example, you can use tables, graphs, rules to show your thinking.

8. True or False? *Every growing sequence can also be seen as a decreasing (shrinking) sequence if you read it backwards.* True or false? Provide two examples or counterexamples and explain.

9. What's My Rule? I have a sequence where each term equals the previous term multiplied by 1.2 then minus 3. My first term is 10.

a. Write out Terms 1 through 5.

b. Explain in words how the pattern grows or shrinks.

c. Could this ever produce a term that is exactly 0? Why or why not?

10. Create an increasing pattern where Term 2 has 8 circles and another term has 24 circles. Represent the pattern in at least 3 other ways (e.g., picture, table of values, graph, pattern rule to show which term has 24 circles).

11. Emma puts aside money each week into her “future fund.” Her plan:

In Week 1 she saves \$5.

In Week 2 she adds \$2 more than she did in Week 1.

In Week 3 she adds \$2 more than she did in Week 2.

And so on...each week’s deposit is \$2 more than the previous week’s.

Create a table of values showing how much Emma deposits in Weeks 1 through 6

Plot these deposits on a graph (Week on the horizontal axis, Deposit on the vertical).




Describe the pattern in words. What’s the “rule” for finding Week n ’s deposit?

Use your rule to predict how much she will deposit in Week 10.

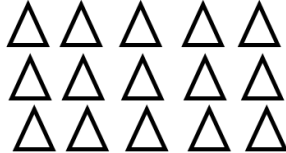

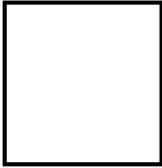
Calculate the total amount Emma will have saved after 10 weeks.

1. Determine the value of each candy. Show your thinking.

a.  + 17 = 38

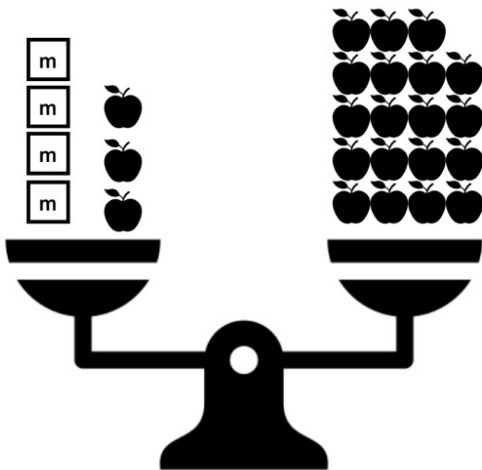
b.   = 72


2. What equation represents the picture? How many triangles are in the box?

 =  + 

3. What number added to 7 gives 23? Write an equation to represent the problem, then solve using inspection.

4. Write an equation to represent the pan balance. Solve the equation to find the value of the unknown (m).



5. Guess and test to find the solution.

a. $38 = 8 + x$

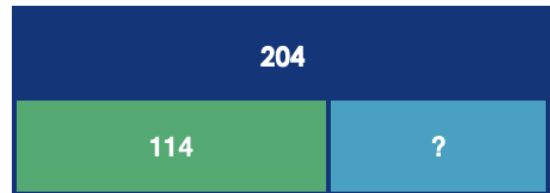
b. $48 = 2x$

USING BAR MODELS TO REPRESENT AND SOLVE ONE-STEP EQUATIONS

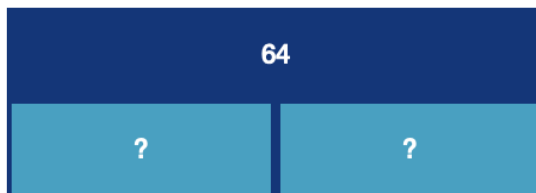
Use the following bar models to create an equation in two different forms. Then, solve the equations.



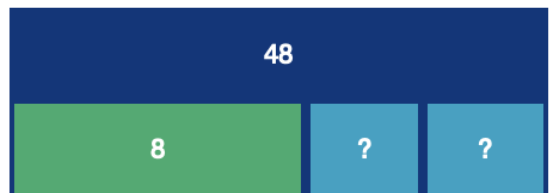
Equation One	
Equation Two	
Solution	



Equation One	
Equation Two	
Solution	



Equation One	
Equation Two	
Solution	



Equation One	
Equation Two	
Solution	

Draw a bar model that represents the following equations and solve.

Equation	$3 + c = 20$
Bar Model	
Solution	

Equation	$18 = 4 + n$
Bar Model	
Solution	

Equation	$y = 6 + 2$
Bar Model	
Solution	

Equation	$30 = a + 5$
Bar Model	
Solution	

6. Solve each equation using algebra tiles, then check your solutions using another method.

a. $x + 4 = 9$

b. $2y = 12$

7. Solve each equation using a strategy of your choice. Show your thinking. Which strategy did you use? Why?

a. $p + 3 = 26$	b. $18 = n + 2$
c. $74 = y - 15$	d. $6b = 42$
e. $9 = 45 \div p$	

8. Find the number that goes in place of each symbol or variable to make a true statement.

a. $20 - z = 15$	b. $\blacktriangle \div 7 = 2$
c. $8 \blacksquare = 4$	d. $13t = 9$

9. Write a mathematical statement for each of the word sentences.

a. A number plus 7 is equal to 9.

b. Twenty-five plus two times a number is seven.

c. The sum of three times a number and four is equal to thirty.

10. Create a picture to model the equation, $4n + 2 = 8$

11. Write an equation that can be used to solve the problem.

“Who am I?”

a. After adding 12 to both sides of my equation, I became $x = 20$. What is my original equation?

b. After dividing both sides of my equation by 7, I became $n = 2$. What was my original equation?

12. Match each equation on the left with an equivalent form of it on the right by drawing an arrow from left to right. The first one is done for you.

$x + 8 = 17$

$x - 6 = 9$

$5x = 35$

$x4 = 6$

$7 + x = 13$

$12 = x - 5$

$6x = 48$

$x = 7$

$x + 4 = 10$

$x + 3 = 12$

$12x = 96$

$x = 24$

$x - 2 = 13$

$20 = x - 3$

SOLVING STORY PROBLEMS USING EQUATIONS

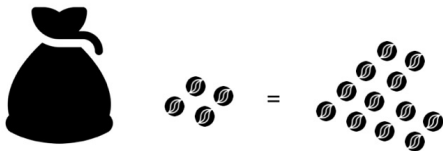
Select five of the following story problems to solve in your math notebooks. Design equations to help you find the solutions and use multiple strategies to determine the solutions. Answer the problems using a full sentence.

1. The difference between two numbers is 67. If the larger number is 125, what is the smaller number?
2. The aquarium has a total number of 145 fish. After some fish were adopted, 89 fish remained. How many fish were adopted?
3. A carpenter has a board that is 244 cm long. If she cuts off 68.5 cm, how many cm of board will be left?
4. Jagpreet's piggy bank has three times as many quarters as her brother's bank. If her brother has 12 quarters, how much money does Jagpreet have in her piggy bank?
5. Marcus is saving money for a new video game that costs \$78. He already has saved one-third of the amount he needs. How much money has Marcus saved so far?
6. The length of a rectangle is 5 times its width. If the length is 45 cm, what is the width of the rectangle?
7. Emma's age is half her mom's age. If her mom is 38 years old, how old is Emma?
8. A bakery makes cookies in batches. If 7 batches produce 84 cookies, how many cookies are made in one batch?
9. The distance from Jake's house to school is 2 times the distance from his house to the park. If the distance to school is 16 blocks, how many blocks is it to the park?
10. The school garden has several vegetable beds. Each bed goes 6 tomato plants. If there are 42 tomato plants in total, how many garden beds are there?
11. Your class of 26 students is planning a field trip to Science World. The total cost for all students is \$923. If each student needs to pay the same amount, create an equation to find out how much each should pay.
12. You're helping organize books at the library. You notice that when 15 books are placed equally on each shelf, the shelves look full. If you have 90 books, how many shelves will you need?
13. The school cafeteria is planning lunch for a group of students who won a math contest. They know that each table seats 8 students. Write an equation to help them determine how many tables they need. Test your equation with 56 students.
14. A local animal shelter spends \$35 per week to care for each cat. If their weekly budget for cat care is \$420, how many cats can they care for at the shelter?
15. A group of friends is sharing the cost of a pizza party. The total cost is \$84. Determine each person's share, if 12 people share the cost.



13. How many marbles are in the bag? How do you know? When there is more than one bag, each bag contains the same number of marbles.

a.



b.



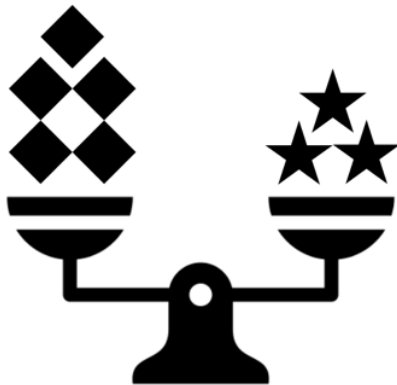
14. Show three ways to solve each equation. Represent your thinking using pictures, symbols and words.

a. $a - 3 = 15$

b. $3p = 45$

15. Which method of solving one-step equations do you prefer (e.g., guess and test, inspection, bar model, balance, algebra tiles, etc.)? Show an example to explain your choice.

16. What could the value of each symbol be? Explain your thinking.





LINEAR EQUATIONS MATH MENU TASK

Build as few linear equations as possible to satisfy each rule at least once.

A.	The equation has a variable on one side of the equality	B.	The right side of the equation is 22
C.	The solution is greater than 15	D.	The equation contains no constant terms
E.	The equation has a coefficient that is divisible by 3	F.	The solution is a prime number
G.	All constants and coefficients are odd numbers		

*Which rules pair nicely?
Which rules cannot be paired?*

Describe how you built each linear equation.
Be sure to identify which linear equations you designed satisfy which rules.