

2020

Erie Rise Leadership
Academy Charter School

Parent Lesson Plan

DRAFT

[PARENT LESSON PLAN]

4TH GRADE BOYS WEEK 1 MARCH 23-27

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INTRODUCTION

Hello Parents!

Included in this packet is a week's worth of printed ELA and Mathematics work for your students while they are at home. Each day is separated into the 2 content areas for the printed material. If you have access to the digital curriculum, a pacing guide is also provided outlining the digital component assigned for each specific day. If you need technology, please contact the school and we can make it available to you. Also remember, USATestPrep is always an option!

We know some of this material maybe be challenging, but try your best to complete it! Hopefully we will see you back in the classroom soon and will be able to go over all the information.

Printed materials may be turned into to the distribution centers once completed, but it is not a requirement.

Mrs. Will will be available on Youtube Live every day from 10AM-11AM to assist with curriculum questions and/or any resource questions for parents or students.

Stay safe and healthy everyone!

Missing seeing everyone's smiling face! Remember to wash your hands!

Educationally Yours ,
Mrs. Veronica Will

HELPFUL INFORMATION

Distribution Sites/Information

Food/Curriculum distribution will take place at:

Erie Rise Leadership Academy Charter School
1006 West 10th Street
Erie, PA 16502

Leadership Team

Mr. Terry Lang, CEO: 814 812-0503
Mrs. Veronica Will, Principal: 814 873-5158
Mr. Aubrey Favors, HR: 814 812-3026
Mr. Kirk Paskell, Transportation: 814 566-0002
Mr. Homer Smith, PR: 814 392-3413
Mrs. Pearl Jeffries, Social Services: 814 722-5056

DIGITAL LESSON PACING GUIDE

ConnectED Instructions

Please see attached instructions for accessing the digital curriculum.

USATestPrep Instructions

Please see attached instructions for accessing this test-prep site.

If you have access to high speed internet, below are the assignments the teachers have assigned for the various content areas:

USA Test Prep Week 1 Assignments:

Math Assignments: *Math 3/23, Math 3/24, Math 3/25, Math 3/26, Math 3/27*

ELA Assignments: *ELA 3/23, ELA 3/24, ELA 3/25, ELA 3/26, ELA 3/27*

Science Assignments: *Science 3/23, Science 3/24, Science 3/25, Science 3/26, Science 3/27*

Pacing Guide for Online Curriculum

	Monday	Tuesday	Wednesday	Thursday	Friday
ELA/Writing	<u>Lesson:</u> Unit 4 Lesson 4 Day 1 <u>Assignment:</u> Unit 4 Lesson 4 Day 1	<u>Lesson:</u> Unit 4 Lesson 4 Day 2 <u>Assignment:</u> Unit 4 Lesson 4 Day 2	<u>Lesson:</u> Unit 4 Lesson 4 Day 3 <u>Assignment:</u> Unit 4 Lesson 4 Day 3	<u>Lesson:</u> Unit 4 Lesson 4 Day 4 <u>Assignment:</u> Unit 4 Lesson 4 Day 4	<u>Lesson:</u> Unit 4 Lesson 4 Day 5 <u>Assignment:</u> Unit 4 Lesson 4 Day 5
Math	<u>Lesson:</u> Chapter 7 Lesson 3 <u>Assignment:</u> Chapter 7 Lesson 3	<u>Lesson:</u> Chapter 7 Lesson 4 <u>Assignment:</u> Chapter 7 Lesson 4	<u>Lesson:</u> Chapter 7 Check My Progress <u>Assignment:</u> Chapter 7 Check My Progress	<u>Lesson:</u> Chapter 7 Lesson 5 <u>Assignment:</u> Chapter 7 Lesson 5	<u>Lesson:</u> Chapter 7 Lesson 6 <u>Assignment:</u> Chapter 7 Lesson 6

ELA PRINT MATERIAL

Day 1-

Complete 1-2 Worksheets a day

Day 2-

Complete 1-2 Worksheets a day

Day 3-

Complete 1-2 Worksheets a day

Day 4-

Complete 1-2 Worksheets a day

Day 5-

Complete 1-2 Worksheets a day

MATH PRINT MATERIALS

Chapter 7 Reteach Lessons

Follow through packet to complete the Lesson and Homework Assignments.

- Complete one/two Lessons a Day.

ADDITIONAL RESOURCES (EDUCATIONAL)

Included are a list of hand selected resources for students with internet to use at home.

Virtual Fieldtrips

https://docs.google.com/document/d/1SvldgTx9djKO6SjyvPDsoGikgE3iExmi3qh2KRRku_w/mobilebasic

VOOKS- storybooks brought to life

www.vooks.com/parent-resources

XtraMath- basic math facts

<https://xtramath.org/#/home/index>

GoNoodle

<https://www.gonoodle.com/>

ABCYa

<https://www.abcya.com/grades/3>

StudyJams

<http://studyjams.scholastic.com/studyjams/>

Name

Lesson 3 Sequences

ESSENTIAL QUESTION ?

How are patterns used in mathematics?

Patterns follow a rule. Each number in a numeric pattern is called a **term**. The ordered arrangement of terms that make up a pattern is called a **sequence**.



Math in My World

Tutor



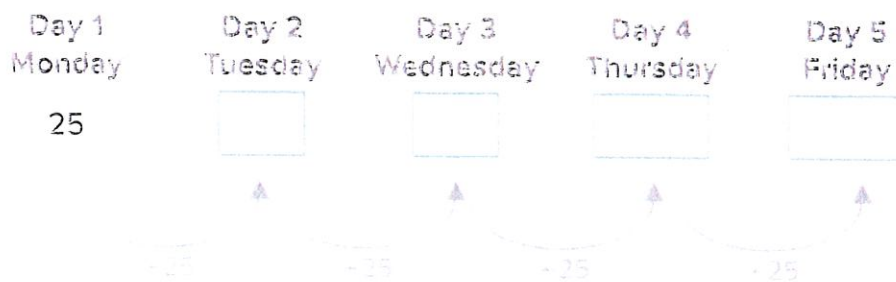
Example 1

Crystal starts reading her book on Monday. She reads 25 pages on the first day. Each day, she reads 25 pages. How many total pages will she have read by Tuesday, Wednesday, Thursday, and Friday?

The first term of the sequence is 25.

The rule is add 25.

Extend the pattern.



So, Crystal will have read _____ pages by Tuesday, _____ pages by Wednesday, _____ pages by Thursday, and _____ pages by Friday.

Example 2

The first term of a sequence is 65. The rule of the sequence is subtract 4. Find the next four terms in the sequence. Then make observations about the pattern.



Find the next four terms.

Terms:	Term 1	Term 2	Term 3	Term 4	Term 5
Sequence:	65	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

The next four terms in the sequence are , , , and .



Make observations about the pattern.

Circle whether the terms are all odd or even. odd even

Circle whether the terms increase or decrease. increase decrease

Extend the pattern to a total of 10 terms.

65, , , , , , , , ,

Make another observation about the pattern.

The ones digits repeat the pattern 5, 1, , , and .

Guided Practice

Extend each pattern by four terms. Write an observation about the pattern.

1. Rule: add 7

Pattern: 8, , , ,

Observation:

2. Rule: subtract 10

Pattern: 90, , , ,

Observation:

Talk MATH

How does the operation of a rule affect the terms of a sequence?

Name _____

Independent Practice

Extend each pattern by four terms. Write an observation about the pattern.

3. Rule: add 9

Pattern: 7, , , , ,

Observation:

4. Rule: add 12

Pattern: 2, , , , ,

Observation:

5. Rule: subtract 9

Pattern: 87, , , , ,

Observation:

6. Rule: subtract 5

Pattern: 86, , , , ,

Observation:

7. Rule: multiply by 3

Pattern: 2, , , , ,

Observation:

8. Rule: multiply by 4

Pattern: 5, , , , ,

Observation:

9. Rule: divide by 2

Pattern: 64, , , , ,

Observation:

10. Rule: divide by 5

Pattern: 625, , , , ,


Observation:

11. Refer to the sequence 11, 16, 21, 26, 31, 36. Explain why the terms in the sequence will continue to alternate between even and odd numbers.



Problem Solving

12. Each pumpkin costs \$8. Jaime has already bought \$24 worth of pumpkins. Suppose he buys five more pumpkins. How much will he spend in all after he buys each pumpkin? Write a sequence.

13. **Processes & Practices**  **Draw a Conclusion** The rule of a pattern is multiply by 3. The first term is 7. What are the next five terms in the sequence?


Write two observations you can make about the pattern.



Brain Builders

14. **Processes & Practices**  **Use Number Sense** Write a sequence with at least 5 terms that forms a pattern. Identify the rule.

Apply your rule to a new starting value to produce a new sequence.

15. **Processes & Practices**  **Reason** The first term in a sequence is an odd number. The rule is to multiply by 2. Are the rest of the terms in the sequence even, odd, or both? Explain.

16.  **Building on the Essential Question** How can I find patterns?

Name _____

MY Homework

Lesson 3

Sequences

Homework Helper



Need help? connectED.mcgraw-hill.com

Extend the pattern described below by four terms.

Then, note two observations about the pattern.

Use repeated subtraction to extend the pattern.

First Term: 46	46	39	32	25
	$\begin{array}{r} -7 \\ \hline \end{array}$	$\begin{array}{r} -7 \\ \hline \end{array}$	$\begin{array}{r} -7 \\ \hline \end{array}$	$\begin{array}{r} -7 \\ \hline \end{array}$
Rule: Subtract 7	39	32	25	18

So, the sequence is 46, 39, 32, 25, and 18.

The terms in the sequence decrease. The terms in the sequence also alternate between even and odd numbers.

Practice

Extend each pattern by four terms. Write an observation about the pattern.

1. Rule: add 8

Pattern: 5, , , ,

Observation:

2. Rule: multiply by 2

Pattern: 3, , , ,

Observation:

3. Rule: subtract 20

Pattern: 175, , , ,

Observation:

4. Extend the pattern below by four terms. Write an observation about the pattern.

Rule: multiply by 10

Pattern: 26, _____, _____, _____, _____

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5. **Mathematical PRACTICE**  **Look for a Pattern** Brad puts an equal amount of money in his savings account once a month. He started with \$25. The next month, he had \$35 in his account. Two months after that, he had \$55 in his account. How much money will Brad have in his account after 6 months? Describe a rule. Then solve.

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6. On Monday, a toy store sold 4 race cars. On Tuesday, it sold 8 race cars. On Wednesday, it sold 16 race cars. Suppose this pattern continues. How many more race cars will be sold on Friday than on Thursday? Describe a rule. Then solve.

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Vocabulary Check

Vocab



Write a vocabulary word to complete each sentence.

sequence term

7. Each number in a numeric pattern is a _____.
8. A _____ is the ordered arrangement of terms that make up a pattern.
9. **Test Practice** Identify the next term in the sequence. 171, 141, 151, 121, 131,
- (A) 161 (B) 141 (C) 121 (D) 101

Name _____



Lesson 4

Problem-Solving Investigation

STRATEGY: Look for a Pattern

ESSENTIAL QUESTION ?

How are patterns used in mathematics?



Learn the Strategy



Daniel is training for a walk-a-thon. In the first week, he walked a total of five miles. In the second week, he walked a total of 7 miles. In the third week, he walked a total of 9 miles. Based on his pattern, how many miles will he walk in the fourth week?



1 Understand

What facts do you know?

Daniel walked _____ miles the first week, _____ miles the second week, and _____ miles the third week.

What do you need to find?

the number of miles Daniel will walk the _____ week

2 Plan

I will look for a pattern to solve the problem.

3 Solve

The sequence of the pattern is: 5, 7, 9.

The rule to the pattern is _____.

Based on the rule, the next term in the sequence is _____.

So, Daniel will walk _____ miles during the fourth week.

4 Check

Does your answer make sense? Explain.

Practice the Strategy

Taryn made 15 hair ribbons on Monday, 21 hair ribbons on Tuesday, and 27 hair ribbons on Wednesday. Based on her pattern, how many hair ribbons will she make on Thursday?

1 Understand

What facts do you know?

What do you need to find?

2 Plan

3 Solve

4 Check

Does your answer make sense? Explain.

Name

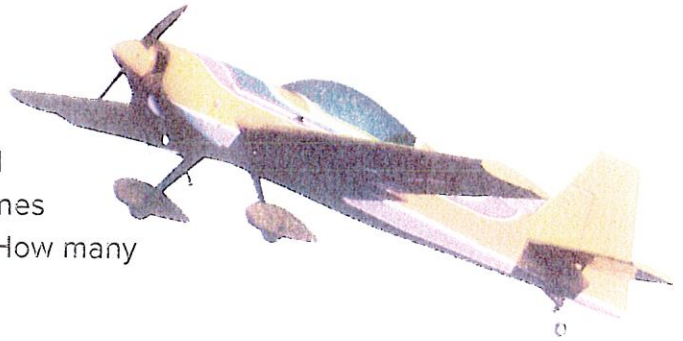
Apply the Strategy

Solve each problem by looking for a pattern.

1. Processes & Practices



Look for a Pattern A store sold 48 model airplanes in August, 58 model airplanes in September, and 68 model airplanes in October. Suppose this pattern continues. How many model airplanes will be sold in December?



Brain Builders

2. The table shows how many tickets were sold for the school play each day.

Day	Number of Tickets
Monday	312
Tuesday	316
Wednesday	320
Thursday	324

Based on the pattern, how many tickets will be sold on Saturday?

3. There are 80 picnic tables at the park. During the first weekend of the summer, there were 40 available tables. During the second weekend, there were 20 available tables. During the third weekend, there were 10 available tables. Based on the pattern, how many picnic tables will be available during the fourth weekend of the summer? Explain.

Review Strategies

Processes & Practices



Use Symbols

A theater can hold 200 people. Two groups rented out the theater. The first group has 92 people and the other has 107 people. Are there enough seats for everyone? Use symbols to explain.

Use any strategy to solve each problem.

- Check for reasonableness.
- Make a table.
- Make a model.
- Look for a pattern.

5. In one hour, Frank earns the money shown below. How much does he earn in 7 weeks if he works 3 hours each week?



6. What is the next number in the pattern 2, 5, 11, 23, ?

7. Katie sold 153 purses at a craft fair. How much money did she earn if each purse cost the amount shown below?



Name _____

Operations and Algebraic Thinking

4.OA.5

Lesson 4

Problem Solving: Look for a Pattern

MY Homework

Homework Helper



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Solve the problem by looking for a pattern.

At ShopSmart, customers receive a \$3 coupon if they spend \$20, a \$6 coupon if they spend \$40, and a \$9 coupon if they spend \$60. If a customer spends \$80, how many dollars worth of coupons will he or she receive if the pattern continues?

1 Understand

What facts do you know?

Customers get a \$3 coupon for every \$20 they spend.

What do you need to find?

I need to find how many dollars in coupons a customer gets for spending \$80.

2 Plan

I will find a pattern to solve the problem.

3 Solve

The sequence of the pattern of the coupons is \$3, \$6, and \$9.

The rule for the pattern is +\$3.

Based on the rule, the next term in the sequence is \$12.

So, customers receive a \$12 coupon for spending \$80.

4 Check


Does the answer make sense?

$\$9 + \$3 = \$12$, so the answer makes sense.



Problem Solving

Solve each problem by looking for a pattern.

1. **Mathematical PRACTICE**  **Plan Your Solution** Angela opened a new bakery. She got orders for 2 cakes the first week, 4 cakes the second week, and 8 cakes the third week. If the pattern continues, how many cake orders will Angela get the fourth week?
2. Manuel saw the following birds this week: 2 blue jays on Monday, 5 cardinals on Tuesday, 4 blue jays on Wednesday, 7 cardinals on Thursday, and 6 blue jays on Friday. If the pattern continues, what is the number and type of bird Manuel will see Saturday?



Brain Builders

3. The house numbers on the north side of Flynn Street are even. In one block, the house numbers begin 1022, 1032, 1042, and 1052. If Taylor is at 1022 Flynn Street, how many houses away is 1082?
4. Jessica is voting for dancers in a contest. She votes for the first contestant 5 times, the second contestant 9 times, and the third contestant 13 times. If she continues this pattern, how many total votes will Jessica cast for the first four contestants? Explain.
5. A towel has a repeating pattern of 2 green stripes, then 3 blue stripes, and then 1 yellow stripe. If the towel has 20 stripes altogether, how many green stripes are on it? Explain.

Check My Progress

Vocabulary Check

Vocab



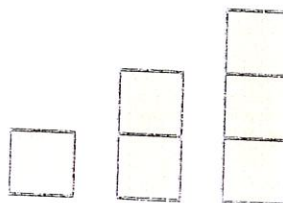
Identify each pattern as a nonnumeric pattern or a numeric pattern.



2. 43, 46, 47, 50, 51, 54, 55

3. 98, 88, 78, 68, 58, 48

4.



Use the pattern below for Exercises 5–7.

2, 6, 18, 54, 162

5. Put a circle around one term in the pattern.

6. Underline the sequence.

7. Write the rule for this pattern.

Concept Check

8. Extend the pattern. Draw the shapes on the lines.



9. Extend the pattern. Write the rule.

3, 8, 13, 18, 23,

The rule is

10. Extend the pattern below by four terms. Write an observation about the pattern.

Rule: subtract 6

Pattern: 76, , , ,

Observation:



Problem Solving

11. On Mondays, Wednesdays, and Fridays, Luke packs his lunch. On Tuesdays and Thursdays, Luke buys his lunch. Draw a nonnumeric pattern to show the pattern of Luke's lunch for two weeks.



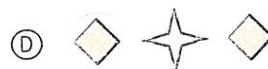
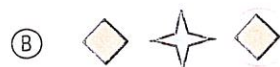
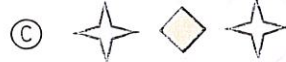
Brain Builders

12. Bob swims 10 laps on even numbered dates. He swims 15 laps on odd numbered dates. How many laps has he completed by the sixth of the month? Describe a pattern to solve the problem.

13. **Test Practice** A nonnumeric pattern is shown below.



Which shows the next three objects in the pattern?



Name

Lesson 5

Addition and Subtraction Rules

ESSENTIAL QUESTION
How are patterns used in mathematics?



You can use a rule to write an equation that describes a pattern between **input** and **output** numbers. Tables can be used to show how input numbers change in the same way each time, creating a new output number.



Math in My World



Example 1

Mr. Mathis is creating a table to show how input numbers are changed. Write an equation that describes the pattern in the table. Complete the table.

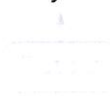
Pattern: $2 + \quad = 9$

$4 + \quad = 11$

$6 + \quad = 13$

Rule: Add .

Equation: $x + \quad = y$



Input (x)	Output (y)
2	9
4	11
6	13
8	
10	
12	

Use the rule to complete the table.

So, the equation that describes the pattern is .

Example 2



A pizza shop offers \$3 off any order over \$10. Use the rule and equation to find the next four output numbers.

Rule: Subtract 3.

Equation: $c - \$3 = d$



Input (c)	Output (d)
\$11	\$8
\$12	
\$14	
\$16	
\$18	

Find the next four numbers when the input c is \$12, \$14, \$16, and \$18.

$$c - \$3 = d$$

$$\$12 - \$3 = \$ \square$$

$$c - \$3 = d$$

$$\$14 - \$3 = \$ \square$$

$$c - \$3 = d$$

$$\$16 - \$3 = \$ \square$$

$$c - \$3 = d$$

$$\$18 - \$3 = \$ \square$$

So, the next four amounts are

Describe another pattern you see in this chart.

Guided Practice

- Write an equation that describes the pattern.

Then use the equation to find the next three output numbers.

Input (a)	5	9	13	17	21	25
Output (b)	9	13	17			

Talk MATH

Explain what you should do if you test a number in an equation and it does not work.

Name _____

Independent Practice

Write an equation that describes the pattern. Then use the equation to find the next two output numbers.

2.

Input (m)	11	16	21	26	31
Output (n)	2	7	12		

Equation: _____

3.

Input (s)	2	6	10	14	18
Output (t)	15	19	23		

Equation: _____

Use the rule to find the next four output numbers.

4.

Rule: $f + 3 = h$	
Input (f)	Output (h)
3	6
6	
9	
12	
15	

5.

Rule: $v - 11 = w$	
Input (v)	Output (w)
16	5
22	
28	
34	
40	

6.

Rule: $g - 5 = h$	
Input (g)	Output (h)
14	9
19	
24	
29	
34	

Create an input/output table for each equation.

7. $y + 4 = z$


8. $a - 7 = c$

9. Describe a pattern you see in Exercise 2.



Problem Solving

The table shows what a taxi company charges in dollars c for every m miles traveled.

10. **Processes & Practices**  **Use Algebra** Use the table to write an equation for this situation.

Taxi Rates	
Input (m)	Output (c)
10	\$12
15	\$17
20	\$22
25	
30	


11. Find the costs of a 25-mile trip and a 30-mile trip.

12. Use the equation you wrote for Exercise 10 to find the cost of a 60-mile trip.

13. A different taxi company uses the equation $c = m + \$4$ to determine their charges. Find the cost of a 15-mile trip.



Brain Builders

14. **Processes & Practices**  **Model Math** Write a real-world problem that can be represented by the table. Include the solution to your problem.

Input (h)	1	2	3	4	5
Output (m)	\$10	\$20	\$30		

15.  **Building on the Essential Question** How can I find the rule of a pattern?

Name _____

MY Homework

Lesson 5

Addition and Subtraction Rules

Homework Helper

Need help? connectED.mcgraw-hill.com

Write an equation that describes the pattern in the table.
Then use the equation to find the next three output numbers.

Input (d)	12	15	18	21	24	27
Output (f)	19	22	25			

The rule is add 7. The letter d represents the input, and the letter f represents the output. So, the equation is $d + 7 = f$.

Use the equation to find the next three output numbers:

$$21 + 7 = 28$$

$$24 + 7 = 31$$

$$27 + 7 = 34$$

So, the completed table looks like this:

Input (d)	12	15	18	21	24	27
Output (f)	19	22	25	28	31	34

Practice

Write an equation that describes the pattern. Then use the equation to find the next three output numbers.

1.

Input (a)	Output (b)
\$2	\$27
\$4	\$29
\$6	
\$8	
\$10	

Equation:

2.

Input (s)	Output (t)
87	76
80	69
73	
66	
59	

Equation:

Write an equation that describes the pattern. Then use the equation to find the next three output numbers.

3.

Input (x)	Output (y)
22	17
26	21
30	
34	
38	

Equation:

4.

Input (c)	Output (d)
0	8
5	13
10	
15	
20	


Equation:

Brain Builders

Jeremy's class is going on a field trip. The school will bring all the students who are there that day plus 4 chaperones.

5. Write an equation for this situation. Explain how your equation relates to the given information.

Input (s)	Output (p)

5. **Mathematical PRACTICE**  **Use Math Tools** Complete the table to show how many people will go if there are 25, 27, 29, 31, or 33 students. Explain how you can check your answer.

Vocabulary Check

Draw a line to match each word to its meaning.

7. input a number before an operation is performed
8. output a number that is the result of an operation
9. Test Practice Refer to the equation $a - 6 = b$. If $a = 45$, what is the value of b ?
- (A) 16 (B) 39 (C) 51 (D) 60

Name _____

Lesson 6

Multiplication and Division Rules

ESSENTIAL QUESTION ?

How are patterns used in mathematics?

You can write a multiplication or division equation to extend a pattern.



Math in My World



Example 1

Charles washes cars to earn money. If he washes 2 cars, he earns \$12. If he washes 6 cars, he earns \$36. Write an equation to describe the pattern. Then use the equation to find how much money Charles will earn if he washes 8, 10, and 12 cars.

Complete the table. Then look for the pattern that describes a rule.

Pattern: $2 \times \quad = 12$

$4 \times \quad = 24$

$6 \times \quad = 36$

Rule: Multiply by \quad .

Equation: $a \times \quad = b$

Cars Washed	Amount Earned (\$)
Input (a)	Output (b)
2	12
4	24
6	36
8	
10	
12	

Find the next three output numbers when the input a is 8, 10, and 12.

$$8 \times 6 = b$$

$$10 \times 6 = b$$

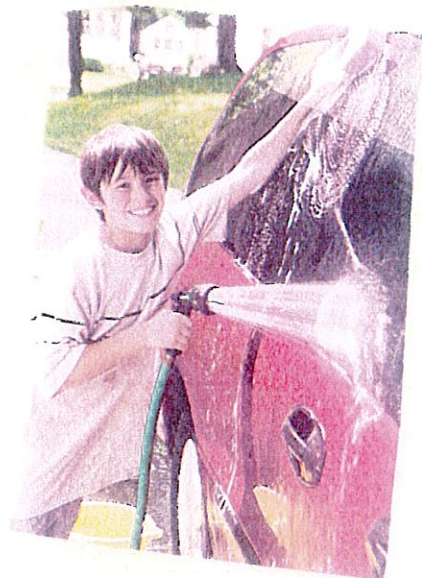
$$12 \times 6 = b$$

$$8 \times 6 =$$

$$10 \times 6 =$$

$$12 \times 6 =$$

So, Charles will earn \$ \quad , \$ \quad , and \$ \quad .



Example 2



It costs \$4 for each box of crackers. The equation is shown below. Use the equation to complete the table.

Rule: Divide by 4.

Equation: $g \div 4 = h$



Total Cost (\$)	Boxes of Crackers
Input (g)	Output (h)
4	1
8	
12	
16	
20	
24	

Find the next five output numbers when the input g is 8, 12, 16, 20, and 24.

$$g \div 4 = h$$

$$g \div 4 = h$$

$$g \div 4 = h$$

$$g \div 4 = h$$

$$g \div 4 = h$$

$$8 \div 4 =$$

$$12 \div 4 =$$

$$16 \div 4 =$$

$$20 \div 4 =$$

$$24 \div 4 =$$

So, the next five output numbers are

Describe another pattern you see in this table.

Guided Practice

- Write an equation that describes the pattern. Then use the equation to find the next three output numbers.

Input (w)	2	4	6	8	10	12
Output (v)	12	24	36			

Equation:

Describe a pattern you see in this chart.



How are a rule and an equation alike? How are they different?

Name

Independent Practice

Write an equation that describes the pattern. Then use the equation to find the next three output numbers.

2.

Input (m)	1	3	5	7	9	11
Output (n)	5	15	25			

Equation:

4.

Input (j)	4	8	12	16	20	24
Output (k)	1	2	3			

Equation:

6.

Input (x)	16	24	32	40	48	56
Output (y)	2	3	4			

Equation:

3.

Input (b)	2	4	6	8	10	12
Output (c)	14	28	42			

Equation:

5.

Input (e)	10	20	30	40	50	60
Output (f)	2	4	6			

Equation:

7.

Input (t)	12	10	8	6	4	2
Output (v)	24	20	16			

Equation:

Create an input/output table for each equation.

8. $a \times 5 = b$


9. $c \div 6 = d$

10. Describe a pattern you see in Exercise 6.



Problem Solving

Sari makes bead necklaces. The table shows the number of blue beads and green beads Sari uses.

11. **Processes & Practices**  **Use Algebra** Write an equation that describes the relationship between green beads and blue beads.


Blue Beads	Green Beads
Input (j)	Output (k)
3	1
9	3
15	5
21	
27	
33	

12. How many green beads does Sari need if she is using 36 blue beads?



Brain Builders

13. How many beads does Sari have in all if she has 30 green beads? Explain.

14. **Processes & Practices**  **Reason** Circle the operation that can be used to write an equation for the input/output table to the right. Explain.

Input (m)	Output (n)
1	2
2	4
3	6

addition subtraction multiplication division

15.  **Building on the Essential Question** How can an input/output table help me solve a real-world problem?

Name _____

Lesson 6

Multiplication and
Division Rules

MY Homework

Homework Helper

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Write an equation that describes the pattern in the table below.

Then use the equation to find the next three output numbers.

Input (k)	2	4	6	8	10	12
Output (m)	6	12	18			

The rule is multiply by 3. The letter k represents the input, and the letter m represents the output. So, the equation is $k \times 3 = m$.

Use the equation to find the next three output numbers:

$8 \times 3 = 24$

$10 \times 3 = 30$

$12 \times 3 = 36$

So, the completed table looks like this:

Input (k)	2	4	6	8	10	12
Output (m)	6	12	18	24	30	36

Practice

Write an equation that describes the pattern. Then use the equation to find the next three output numbers.

1.

Input (a)	Output (b)
7	1
14	2
21	
28	
35	

Equation:

2.

Input (s)	Output (t)
99	33
84	28
69	
54	
39	

Equation:

Write an equation that describes the pattern. Then use the equation to find the next three output numbers.

3.

Input (x)	Output (y)
\$5	\$40
\$6	\$48
\$7	
\$8	
\$9	

Equation: _____

4.

Input (c)	Output (d)
50	10
45	9
40	
35	
30	

Equation: _____



Problem Solving

Shawna found out there are 4 yellow pencils for every blue pencil.

5. **Mathematical PRACTICE 2** Use Algebra Write an equation for this situation. Explain your equation.



Brain Builders

6. Complete the table to show how many yellow pencils there are if there are 5, 7, 9, 11, or 13 blue pencils. How many of each type of pencil does Shawna have if she has 55 pencils?

Input (s)	Output (p)

7. **Test Practice** Refer to the equation $a \times 9 = b$. If $a = 3$, what is the value of b ?

(A) 3 (B) 12 (C) 18 (D) 27

Name _____

Lesson 7

Order of Operations

ESSENTIAL QUESTION ?

How are patterns used in mathematics?

An expression is a combination of numbers, variables, and at least one operation.

When an expression has more than one operation, the order of operations tells us which one to perform first, so that everyone gets the same answer. Parentheses () are symbols which indicate how to group operations.



Math in My World



Example 1

The table shows how much movie tickets cost. How much will it cost to buy 3 adult tickets and 5 child tickets?

Ticket	Cost
Adult	\$8
Child	\$5

cost = 3 adult tickets + 5 child tickets

$$c = 3 \times \$8 + 5 \times \$5$$

$$c = \$ \quad + \$$$

$$c = \$$$

So, the total cost is \$.

Key Concept Order of Operations

1. Perform operations in parentheses.
2. Multiply and divide in order from left to right.
3. Add and subtract in order from left to right.

Remember, an expression is a combination of numbers, variables, and at least one operation.

Example 2



Find the value of the expression $3 \times (4 + 6)$.

$$3 \times (4 + 6)$$

$$3 \times$$

$$\text{So, } 3 \times (4 + 6) =$$

Example 3

Find the value of the expression $(7 - 3) \div (2 + 2)$.

$$(7 - 3) \div (2 + 2)$$

$$\text{So, } (7 - 3) \div (2 + 2) =$$

Guided Practice

Find the value of each expression.

1. $12 - 1 \times 3 =$

2. $15 - 4 \times 2 =$

3. $(15 - 4) \times 2 =$

Talk Math
Explain why Exercises 2 and 3 have different answers even though the numbers are the same.

Name _____

Independent Practice

Find the value of each expression.

4. $8 + 5 \times 2 =$

5. $10 - 1 \times 5 =$

6. $4 + 6 \div 2 =$

7. $9 \times 2 - 6 =$

8. $(16 + 2) \div 3 =$

9. $6 \times (6 - 2) =$

10. $(12 - 4) \div 4 =$

11. $12 - (4 \div 4) =$

12. $(3 + 6) \div (3 \times 1) =$

13. $3 + (6 \div 3) \times 1 =$

Algebra Use the order of operations to find the unknown in each equation.

14. $5 \times 4 - \quad = 13$

The unknown is _____

15. $\quad \times (8 + 6) = 42$

The unknown is _____

16. $(2 + 1) \times (9 - \quad) = 12$


The unknown is _____

17. $(10 \div 2) + (\quad + 3) = 40$

The unknown is _____





Problem Solving

18. Each bag of dried apples has 5 servings. Each bag of dried apricots has 3 servings. How many servings of dried fruit are in 6 bags of dried apples and 2 bags of dried apricots?
19. Each book costs \$4. How much does it cost to buy 3 books and one magazine that costs \$5?
20. **Processes & Practices**  **Use Number Sense** A sandwich costs \$6 and a drink costs \$3. How much does it cost to buy 4 sandwiches and 4 drinks?



Brain Builders

21. **Processes & Practices**  **Keep Trying** Use each of the numbers 1, 2, 3, and 4 exactly once in the equation below to make the equation true.
- $$(\square \times \square) + (\square \div \square) = 10$$
22. **Processes & Practices**  **Make a Plan** Find possible unknown values to make the equation true. $(\square \times \square) + (\square \div 2) = 15$

Explain why there is more than one possible answer.

23.  **Building on the Essential Question** Write a problem that shows why knowing the order of operations is important.

Name _____

Operations and Algebraic Thinking

4.OA.3

MY Homework

Lesson 7

Order of Operations

Homework Helper



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Find the value of each expression.

$$8 \times 7 - (9 \div 3) = ?$$

$$8 \times 7 - (9 \div 3)$$

$$8 \times 7 - 3$$

Perform the operation inside parentheses first.

$$56 - 3$$

Multiply.

$$53$$

Subtract.

$$\text{So, } 8 \times 7 - (9 \div 3) = 53.$$

$$24 - 2 \div 6 \times 3 = ?$$

$$24 - 2 \div 6 \times 3$$

$$24 - 2 \div 18$$

Multiply.

$$22 \div 18$$

Subtract.

$$40$$

Add.

$$\text{So, } 24 - 2 \div 6 \times 3 = 40.$$

Practice

Find the value of each expression.

1. $5 + 9 \div 3 =$

2. $45 - (6 \times 5) =$

Find the value of each expression.

3. $(3 + 1) + 27 \div 9 =$

4. $5 \times 5 - 8 =$

5. $(4 + 20) \div 2 + 6 =$

6. $2 \times 9 + 14 \div 2 =$



Problem Solving

7. Mathematical PRACTICE



Model Math Tami buys two books that cost \$14 each. She pays an additional \$2 in tax. How much did Tami pay altogether?



Brain Builders

8. Claudio had 34 toy cars. He lost two at the park. Then he divided the rest of the cars evenly among himself and 3 cousins. Write an expression to represent the situation. How many cars did each child get?

9. Last week, Jean did two sit-ups on Monday and three sit-ups on Wednesday. This week, Jean did three times as many sit-ups as last week. Jean used the expression $2 + 3 \times 3$ to find the number of sit-ups she did this week. Explain and correct her error.

10. **Test Practice** Which expression has a value of 20?

(A) $2 \times 5 + 5$

(C) $3 \times 7 - 1$

(B) $3 \times (5 + 5)$

(D) $40 \div 5 - 3$

Check My Progress

Vocabulary Check

Vocab



Use the words in the word bank to complete each sentence.

equation

input

operation

output

unknown

- In the equation $4 + x = 7$, the variable x is a(n) _____.
- In the table to the right, the letter m represents the _____. The letter n represents the _____.
- A(n) _____ is a sentence that contains an equals sign ($=$), showing that two expressions are equal.
- Addition is an example of a(n) _____.

$m + 5 = n$	
m	n
2	7
3	8

Concept Check

Write an equation that describes the pattern. Then use the equation to find the next three output numbers.

5

Input (a)	4	5	6	7	8	9
Output (b)	9	10	11			

Equation:

6

Input (c)	6	8	10	12	14	16
Output (d)	12	16	20			

Equation:

Find the value of each expression.

7. $(7 + 5) \div 3 =$

8. $11 - 2 \times 5 =$



Problem Solving

9. The amount in dollars c a bus company charges to take s students on a field trip are shown at the right. Write an equation to describe the pattern. Then complete the table to show how much it would cost for 40 and 50 students to go on a field trip.

Students	Cost (\$)
10	60
20	70
30	80
40	
50	



Brain Builders

10. A local sports team sells 6 tickets for \$42, 8 tickets for \$56, and 10 tickets for \$70. Write a rule and equation to find the cost of 20 tickets.
11. Each peanut butter snack costs \$2. Each chocolate snack costs \$1 more than each peanut butter snack. How much does it cost to buy 6 peanut butter snacks and 8 chocolate snacks? Write an equation.
12. **Test Practice** What is the value of m in the equation to the right if $n = 6$? $9 \times n = m$
- (A) 15 (C) 54
(B) 27 (D) 81

Name _____



Lesson 8

Hands On

Equations with Two Operations

ESSENTIAL QUESTION ?

How are patterns used in mathematics?

Sometimes an equation has more than one operation.

Build It



Model the equation $(n \times 3) + 5 = y$

1

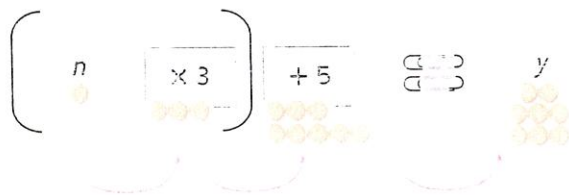
Set up an equation machine.

Use paper plates to represent the variables, rubber bands for parentheses, paper clips for the equals sign, and index cards to show the numbers and operations.

2

Input counters to find y .

Suppose n equals 1. Place 1 counter on the plate labeled n . Move the counters through the machine, following the operations given. Use the order of operations.



3

Record the equation

Fold a piece of paper in half and label it as shown.

When $n = 1$, $y = 8$

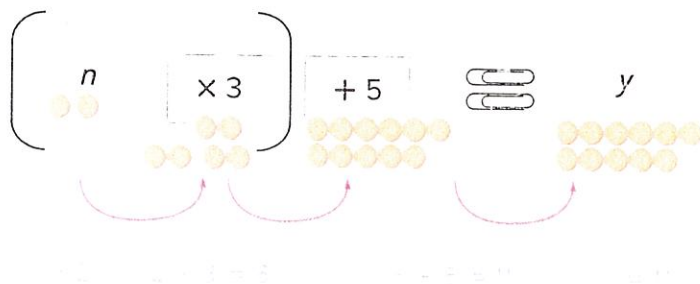
So, when $n = 1$, $y =$ _____



Try It

Input more values for the equation $(n \times 3) + 5 = y$. Find new input and output values.

Suppose n equals 2. Find the value of y .



So, when $n = 2$, $y =$

Repeat the process for input values of 3, 4, and 5.

Record your input (n) and output (y) values.

When n is...	y equals...
1	8
2	
3	
4	
5	

Talk About It

Processes & Practices **2** Use Algebra Refer to the equation $(n \times 3) + 5 = y$. What is the value of y when n equals 6? 7?

2. Given the equation $(n + 7) \times 3 = y$, how would you find the value of y if n equals 3?

Name

Practice It

Use each equation to find each unknown. Use models if needed.

3. $(t + 8) \times 2 = s$

When $t = 4$, $s =$.

4. $(m \times 6) + 4 = d$

When $m = 3$, $d =$.

5. $8 + (z \times 2) = w$

When $z = 5$, $w =$.

6. $(a \div 6) + 5 = b$

When $a = 18$, $b =$.

7. $12 - (e \times 4) = f$

When $e = 2$, $f =$.

8. $(r + 8) \times 6 = s$

When $r = 3$, $s =$.

9. $(g - 4) \times 7 = h$

When $g = 12$, $h =$.

10. $64 \div (p + 4) = q$

When $p = 4$, $q =$.



Apply It

11. Set up an equation machine to show $(x + 4) \div 3 = y$.
Find the values of y when $x = 8$, $x = 11$, and $x = 20$.

When $x = 8$, $y =$.

When $x = 11$, $y =$.

When $x = 20$, $y =$.

12. **Processes
& Practices**



Find the Error Robert is finding the output values for the equation $a + 7 \times 3 = b$. He wrote a few statements about the input and output values.

When $a = 3$, $b = 30$.

When $a = 4$, $b = 33$.

When $a = 5$, $b = 36$.

What is Robert's mistake?

Use the equation correctly to find the output values.

When $a = 3$, $b =$.

When $a = 4$, $b =$.

When $a = 5$, $b =$.

Rewrite the equation so that Robert's values are correct.

Write About It

13. How do parentheses affect the value of expressions?

Name _____

Operations and Algebraic Thinking

4.OA.5

Lesson 8

Hands On:
Equations with
Two Operations

Homework Helper



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Use the equation $(t \times 3) + 5 = w$ to find w when $t = 4$.

$$(t \times 3) + 5 = w$$

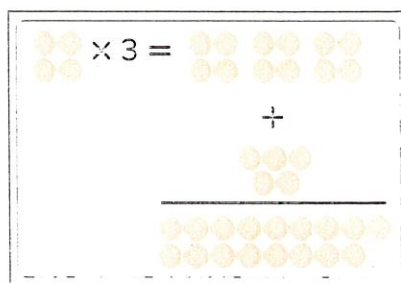
$$(4 \times 3) + 5 = w$$

$$12 + 5 = w$$

$$17 = w$$

When $t = 4$, $w = 17$.

The counters at the right model this equation.



Practice

Use each equation to find each unknown. Draw models if needed.

1 $(z + 3) \times 2 = y$

When $z = 2$, $y =$ _____

2 $4 + (g \times 3) = m$

When $g = 3$, $m =$ _____

Use each equation to find each unknown. Draw models if needed.

3. $2 + (n \times 7) = p$

When $n = 1$, $p =$.

4. $(r \times 2) + 6 = v$

When $r = 4$, $v =$.

5. $6 + (a \times 3) = b$

When $a = 5$, $b =$.

6. $(j \div 4) + 8 = k$

When $j = 16$, $k =$.



Problem Solving

7. Set up an equation machine to show $(x + 2) \times 5 = y$.

Find the values of y when $x = 5$, $x = 8$, and $x = 12$.

When $x = 5$, $y =$.

When $x = 8$, $y =$.

When $x = 12$, $y =$.

3. Mathematical PRACTICE



Understand Symbols Bryan made up a game.

Each team starts with seven points. Each time a team answers a question correctly, they earn five points. The equation used to find the total number of points is $7 + (5 \times q) = t$. Find the total number of points (t) when a team answers six questions (q) correctly.

Name _____

Lesson 9

Equations with Multiple Operations

ESSENTIAL QUESTION ?

How are patterns used in mathematics?

You have used tables to show equations with one operation. A table can also help you show equations with two operations.



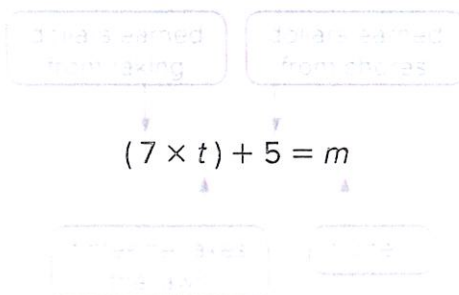
Math in My World



Example 1

Sam earns \$7 each time he rakes his neighbor's lawn. He also earns \$5 each week for doing chores at home. Sam wants to find what he will earn in a week if he does chores and rakes the lawn 1, 2, and 3 times.

1 Write an equation.



2 Complete the table

So, during one week, if Sam rakes the lawn once, he will earn \$ _____. If he rakes the lawn twice, he will earn \$ _____. If he rakes the lawn three times, he will earn \$ _____.

Sam's Money		
Input (t)	$(7 \times t) + 5 = m$	Output (m)
1	$(7 \times \text{ }) + 5 = 12$	12
2	$(7 \times \text{ }) + 5 = 19$	
3	$(7 \times \text{ }) + 5 =$	

Equations can have multiple operations.

Example 2



Complete the table to find output numbers when $x = 2, 3, 4,$ and 5 .

Helpful Hint

Solve what is between the parentheses first.

Find the value of y when $x = 2$.

$$2 \times (9 - 2) + 3 = y$$

$$2 \times 7 + 3 = y$$

$$14 + 3 = y$$

$$17 = y$$

Repeat the process when $x = 3, 4,$ and 5 .

When $x = 3, y =$ _____.

When $x = 4, y =$ _____.

When $x = 5, y =$ _____.

Describe patterns you see in the table.

$2 \times (9 - x) + 3 = y$	
Input (x)	Output (y)
1	19
2	
3	
4	
5	

Talk MATH

Explain how tables can help you solve a problem.

Guided Practice

- Complete the table.

$(5 - x) \times 4 = y$	
Input (x)	Output (y)
1	24
2	
3	
4	

Independent Practice

Complete each table.

2.

$(7 - x) \times 7 = y$	
Input (x)	Output (y)
1	42
2	
3	
4	

3.

$(2 + x) \times 6 = y$	
Input (x)	Output (y)
1	18
2	
3	
4	

4.

$(4 \times x) - 3 = y$	
Input (x)	Output (y)
1	1
2	
3	
4	

5.

$(9 - x) + 2 = y$	
Input (x)	Output (y)
1	10
2	
3	
4	

6.

$(12 \div x) + 5 = y$	
Input (x)	Output (y)
1	17
2	
3	
4	

7.

$(14 - x) \div 2 = y$	
Input (x)	Output (y)
2	6
4	
6	
8	

8.


$(5 \times x) \div 5 + 1 = y$	
Input (x)	Output (y)
1	2
2	
3	
4	

9.

$3 \times (10 - x) \div 4 = y$	
Input (x)	Output (y)
1	31
3	
5	
7	



Problem Solving


10. **Processes & Practices**  **Use Math Tools** It costs \$3 to park at the fair. Tickets cost \$6 each. How much will it cost a family of 4 to go to the fair? Complete the table to solve.

$(\$6 \times x) + \$3 = y$	
Input (x)	Output (y)
1	\$9
2	
3	
4	




Brain Builders

11. Tam walks 2 miles each way to school each day. During gym class, she always runs three times as far as Dante. How many miles will Tam walk and run in one 5-day school week if Dante runs 1 mile each day?

12. **Processes & Practices**  **Find the Error** Ashley completed the table shown. Find and correct her mistake. Explain.

$(10 - x) \times 2 = y$	
Input (x)	Output (y)
1	11
2	10
3	9

Write a situation that could be represented by the values in the table.

13.  **Building on the Essential Question** Describe a real-world situation that could use a table with two operations. Create a table for the situation with 3 pairs of input/output values.

Name _____

MY Homework

Lesson 9

Equations with Multiple Operations

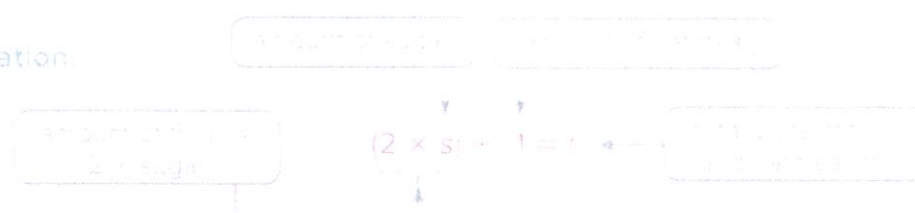
Homework Helper



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Lauren's recipe calls for 2 times as many cups of flour as sugar. She always adds 1 cup of oatmeal. If she uses 2, 3, or 4 cups of sugar, how many cups of flour and oatmeal mix will she use?

1 Write an equation.



2 Make a table.

$(2 \times s) + 1 = f$	
Input (x)	Output (f)
2	5
3	7
4	9

$$(2 \times 2) + 1 = 5$$

$$(2 \times 3) + 1 = 7$$

$$(2 \times 4) + 1 = 9$$

If she uses 2 cups of sugar, she will use 5 cups of flour and oatmeal mix.

If she uses 3 cups of sugar, she will use 7 cups of flour and oatmeal mix.

If she uses 4 cups of sugar, she will use 9 cups of flour and oatmeal mix.

Practice

1 Complete the table.

$(3 \times x) + 2 = y$	
Input (x)	Output (y)
1	5
2	8
3	
4	

Complete each table.

2.

$(12 \div x) + 3 = y$	
Input (x)	Output (y)
1	15
2	9
3	
4	

3.

$(4 + x) \times 6 = y$	
Input (x)	Output (y)
1	30
2	36
3	
4	

4.

$(10 - x) \times 7 = y$	
Input (x)	Output (y)
1	63
2	56
3	
4	

5.

$(5 \times x) + 5 = y$	
Input (x)	Output (y)
1	10
2	15
3	
4	

6.


$(6 + x) \times 2 + 3 = y$	
Input (x)	Output (y)
1	17
2	19
3	
4	

7.

$2 \times (24 \div x) - 2 = y$	
Input (x)	Output (y)
1	46
2	22
3	
4	



Brain Builders

8. **Mathematical PRACTICE**  **Make Sense of Problems** Mauricio hits a baseball 4 times as often as Tony each game. He also hits 20 baseballs every Monday at practice. Tony hits 4 balls at the game Saturday. Write and solve the an equation to find the number of baseballs Mauricio hit this week.

9. Callie loves flowers. She picks 4 tulips for every daisy she picks. Callie's mom also gave her 6 tulips this week from her garden. How many flowers will Callie have this week if she picks 3 daisies? Explain.
10. **Test Practice** Refer to the equation $(x \times 3) - 2 = y$. If $x = 7$, what is the value of y ?

(A) $y = 27$

(B) $y = 23$

(C) $y = 21$

(D) $y = 19$

Review

Chapter 7

Patterns and Sequences

Write the letter of the definition next to the correct word.

- | | |
|-----------------------|--|
| 1. equation | A. A statement that describes a relationship between numbers or objects |
| 2. input | B. A pattern that uses numbers |
| 3. nonnumeric pattern | C. A sentence that contains an equals sign ($=$), showing that two expressions are equal |
| 4. numeric pattern | D. An amount that is not known |
| 5. operation | E. A mathematical process such as addition, subtraction, multiplication, or division |
| 6. output | F. A collection of terms that show a pattern |
| 7. pattern | G. A sequence showing a relationship among terms that are not numbers |
| 8. rule | H. Each number in a sequence |
| 9. sequence | I. The result of an input quantity being changed by a function |
| 10. term | J. A sequence of terms that follow a certain order |
| 11. unknown | K. A quantity that is changed by a function to produce an output |

Concept Check

12. Extend the pattern. Draw the shape on the line.



Identify, describe, and extend each pattern.

13. 4, 20, 100, 500,

The pattern is

14. 44, 22, 20, 10, 8,

The pattern is

Extend each pattern by four terms. Write an observation about the pattern.

15. Rule: add 6

Pattern: 3, , , ,

Observation:

16. Rule: multiply by 2

Pattern: 4, , , ,

Observation:

Write an equation that describes the pattern. Then use the equation to find the next two output numbers.

17.

Input (j)	25	35	45	55	65
Output (k)	21	31	41		

Equation:

18.

Input (g)	1	2	3	4	5
Output (h)	3	6	9		

Equation:

Find the value of each expression.

19. $7 + 3 \times 6 =$

20. $(6 - 4) \times 9 =$

Find the unknown.

21. $(f + 5) \times 3 = g$

When $f = 4$, $g =$

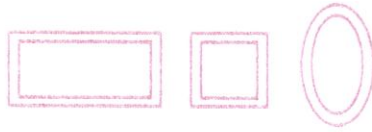
22. $(x \times 4) + 7 = y$

When $x = 8$, $y =$



Problem Solving

23. Kenneth displays his picture frames in the pattern shown below. Every other picture is of his friends and the rest are of his family. If the first picture is of his family, what picture will be in the third square frame?



Brain Builders

24. The admission for an art museum costs \$5 per person. Complete the table using the relationship between the number of people and the cost of admission to the museum.

People	Cost
2	
	\$15
4	
5	
	\$45

25. Mrs. Brown's class can earn 5 minutes of extra recess for each marble she puts in a jar. The class has 15 minutes of recess each morning. Make an input/output table to find how many minutes of recess they will get if they earn 3 marbles. Explain how the order of operations is used to find the amount of recess time.

26. **Test Practice** Find the value of the expression $(5 + 2) \times 7$.

- (A) 14 (C) 21
(B) 19 (D) 49

Reflect

Chapter 7

Answering the ESSENTIAL QUESTION



Use what you learned about patterns to complete the graphic organizer.

ESSENTIAL QUESTION



How are patterns
used in mathematics?

Vocabulary

Nonnumeric
Patterns

Numeric
Patterns

Reflect on the **ESSENTIAL QUESTION**  Write your answer below.

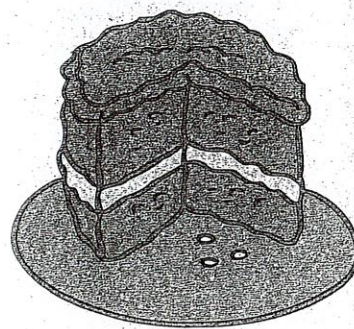
Reading Skills: Main Idea in Paragraphs

Directions: Read each paragraph below. Then, circle the sentence that tells the main idea.

It looked as if our class field day would have to be canceled due to the weather. We tried not to show our disappointment, but Mr. Wade knew that it was hard to keep our minds on the math lesson. We noticed that even he had been sneaking glances out the window. All morning the classroom had been buzzing with plans. Each team met to plan team strategies for winning the events. Then, it happened! Clouds began to cover the sky, and soon the thunder and lightning confirmed what we were afraid of—field day canceled. Mr. Wade explained that we could still keep our same teams. We could put all of our plans into motion, but we would have to get busy and come up with some inside games and competitions. I guess the day would not be a total disaster!

- a. Many storms occur in the late afternoon.
- b. Our class field day had to be canceled due to the weather.
- c. Each team came up with its own strategies.

Allison and Emma had to work quietly and quickly to get Mom's birthday cake baked before she got home from work. Each of the girls had certain jobs to do—Allison set the oven temperature and got the cake pans prepared, while Emma got out all the ingredients. As they stirred and mixed, the two girls talked about the surprise party Dad had planned for Mom. Even Dad didn't know that the girls were baking this special cake. The cake was delicious. "It shows you what teamwork can do!" said the girls in unison.



- a. Dad worked with the girls to bake the cake.
- b. Mom's favorite frosting is chocolate cream.
- c. Allison and Emma baked a birthday cake for Mom.

Directions: Read about how a tadpole becomes a frog. Then, number the stages in order below.

Frogs and toads belong to a group of animals called *amphibians* (am-FIB-ee-ans). This means *living a double life*. Frogs and toads live a double life because they live part of their lives in water and part on land. They are able to do this because their bodies change as they grow. This series of changes is called *metamorphosis* (met-a-MORE-fa-sis).

A mother frog lays her eggs in water and then leaves them on their own to grow. The eggs contain cells—the tiny building blocks of all living things—that multiply and grow. Soon the cells grow into a swimming tadpole. Tadpoles breathe through gills—small holes in their sides—like fish do. They spend all of their time in the water.



The tadpole changes as it grows. Back legs slowly form. Front legs begin inside the tadpole under the gill holes. They pop out when they are fully developed. At the same time, lungs, which a frog uses to breathe instead of gills, are almost ready to be used.

As the tadpole reaches the last days of its life in the water, its tail seems to disappear. When all of the tadpole's body parts are ready for life on land, it has become a frog.

- _____ The front legs pop out. The lungs are ready to use for breathing.
- _____ The cells in the egg multiply and grow.
- _____ The tadpole has become a frog.
- _____ Back legs slowly form.
- _____ Soon the cells grow into a swimming tadpole.
- _____ Front legs develop inside the tadpole.
- _____ The tadpole's tail seems to disappear.
- _____ A mother frog lays her eggs in water.

A **fact** is a statement that can be proven true. An **opinion** is a statement that tells how someone feels or what he or she thinks about something or someone.

Example:

Fact: Ms. Davis is the new principal at Hayes Elementary.

Opinion: Ms. Davis is the nicest principal we ever had.

Directions: Read each pair of sentences below. One is a fact; one is an opinion. Write F before the fact and O before the opinion.

_____ 1. Soccer is the best sport at our school.

_____ More students at our school play soccer than any other sport.

_____ 2. Grandmother Hall lives in Clarksburg.

_____ Grandmother Hall makes the best chocolate-chip cookies!

_____ 3. The county fair gate opens at 10:00 a.m.

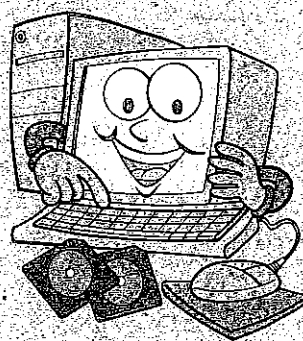
_____ We're going to have a great time at the fair.

_____ 4. The drive along the river is very scenic.

_____ It is a five-mile drive along the river.

_____ 5. Computers make our work much easier.

_____ We have four computers in our classroom.



_____ 6. *The Cinnamon Lake Mysteries* is a very good series.

_____ Our library has several copies of *The Cinnamon Lake Mysteries*.

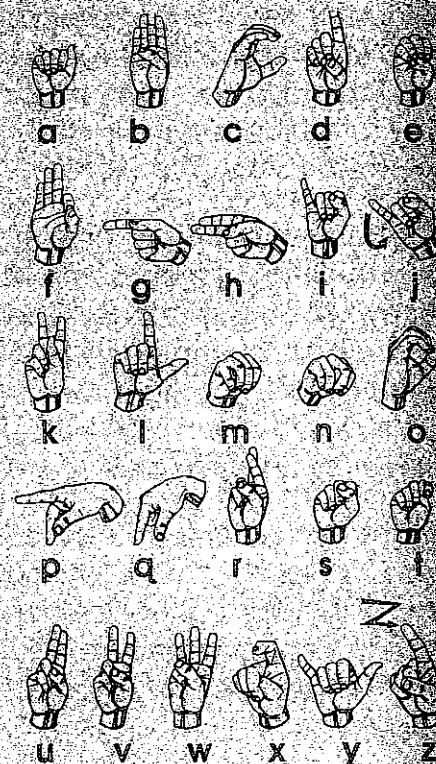
_____ 7. Jerry falls asleep in class every day!

_____ Jerry is so tired, he can't stay awake.

Every sound you hear is made by the movement of air. These movements, called *vibrations*, spread out in waves. Your outer ear collects these sound waves and sends them down a tube to the inner ear. The vibrations hit the eardrum, a flap of skin stretched across the inner end of the tube. As the eardrum vibrates, a tiny bone called the *hammer* moves back and forth. This helps the vibrations move to three small bones and then to the cochlea, where they are changed to nerve impulses. The impulses travel to the brain where they are recognized as sounds.

Some people have trouble hearing or cannot hear at all. This is called *being deaf*. Some deaf people can understand what you are saying by watching how your lips move. They use their eyes as their ears. Sometimes, a hearing aid can help improve hearing. It is like a tiny radio that fits into the ear. Sounds enter the hearing aid and are made much louder.

Deaf people also have difficulty learning to speak because they cannot hear how to say words. Many deaf people "talk" by making pictures with their hands. This kind of talking is called sign language. Every letter of the alphabet has a sign. These signs are shown above.



Directions: Answer these questions about the sense of hearing.

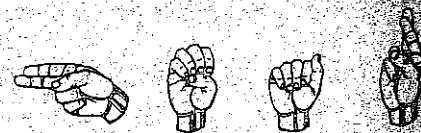
1. Sound is made by movements of the air called _____.

2. The flap of skin stretched over the inner end of the tube inside your ear is called the _____.

3. People who cannot hear are said to be _____.

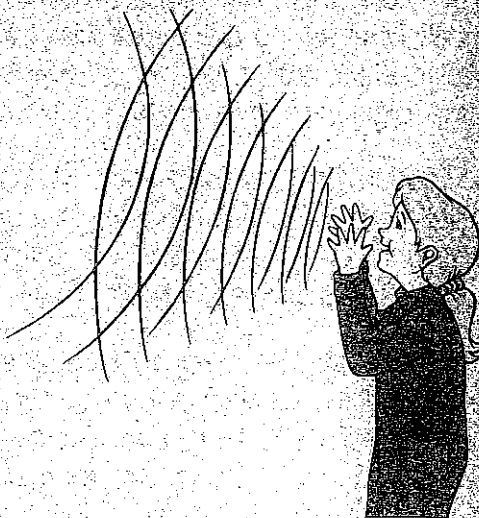
4. Read this word in sign language.

It says _____.



An echo is the repeating of a sound when it is reflected off a surface. For example, if you shout at a solid stone wall, your words often come back to you. This is your echo.

All sounds are made up of vibrations—very quick movements of the air. These vibrations move out in sound waves. When a sound wave hits a hard, smooth surface, it is bent back. A rough surface breaks up the sound waves. In a valley with mountains all around, a sound may be echoed many times.



To experiment with echoes, stand at least 60 feet from the wall you will send the sound against. If you are any closer, the echo comes back too quickly. You would not be able to hear it as a separate sound because it would be mixed up with the original sound.

Directions: Answer these questions about echoes.

1. An echo occurs when sound waves are reflected off a surface. True False
2. Sounds are caused by vibrations of the air. True False
3. When sound hits a rough surface, it is bent back. True False
4. Sounds do not echo very well in a valley. True False
5. You must stand very close to a wall if you want to hear your echo. True False
6. What happens when a sound wave hits a hard, smooth surface?

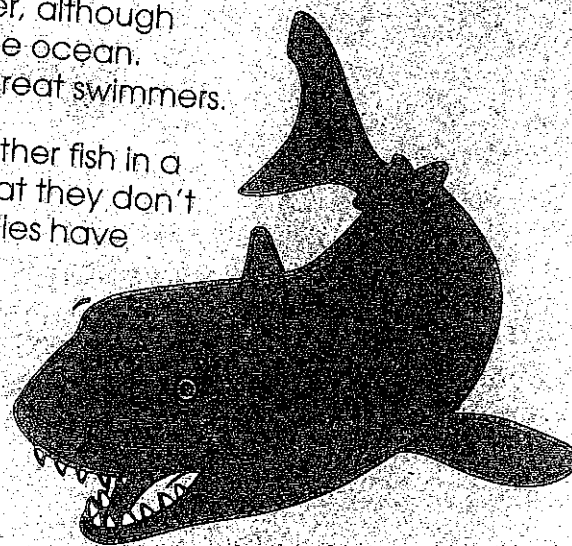
7. How far away must you stand from a wall if you want to experiment with echoes?

8. Which word in the story means to try something as a test?

Sharks are known as the hunters of the sea. They are fish who eat other fish and even other sharks. Most people are frightened of sharks, but only a few of the more than 300 types of sharks are dangerous to people. Sharks vary in size and shape. The whale shark can be up to 60 feet long, but it is harmless. Some kinds of dogfish sharks are only a few inches long!

Sharks usually live in warm water, although they can be found anywhere in the ocean. Because of their shape, they are great swimmers.

Sharks are different from most other fish in a few ways. One important way is that they don't have any bones. Instead, their bodies have tough material called cartilage. Another way sharks are different is that their mouths are on the underside of the head. Most sharks have several rows of very sharp teeth. They never stop growing teeth. If a tooth wears out or is lost, a new one grows in its place.



Sharks spend most of their time eating and looking for food. They are excellent hunters. They can smell the smallest amount of blood from a long way off. Some kinds of sharks swim in packs, but the larger sharks hunt alone. Sharks usually approach their prey carefully, especially if it is big. Unless they are very hungry, they will swim around or circle for some time before attacking. Experienced divers know how to swim with sharks and feed them. They can tell by the way a shark comes up to them if they should be afraid.

Directions: Answer these questions about sharks.

1. Sharks are the hunters of the sea. True False
2. There are thousands of kinds of sharks. True False
3. All sharks are dangerous to humans. True False
4. Sharks actually have very few teeth. True False
5. Sharks spend most of their time eating and looking for food. True False

Reading Comprehension: Jacques Cousteau

Jacques Cousteau was one of the most famous undersea explorers in history. He revolutionized this study with his inventions. His inventions include the aqua-lung and the diving saucer.

Jacques-Yves Cousteau was born in France in 1910. His family traveled a lot when he was a boy. They often visited the Atlantic Ocean. Even then, he was developing what would become a lifelong love for the sea.



Because of all the moving his family did, Cousteau was a poor student in school. He was often in trouble. But there were some areas in which he did very well. He was a wonderful swimmer, and he loved to invent things. Even as a teenager, he invented things that amazed grown-ups. He also learned a lot about other languages. By the time he started college, he was one of the best students in school. Because of his good grades, he was able to go to the French Naval Academy.

During World War II, Cousteau served as an officer in the French Navy. Most of his life became centered around the sea. He dreamed of owning his own ship. Finally, in 1950, he bought the *Calypso* (ca-LIP-so) and turned it into a research ship. Cousteau and his sailors explored the oceans. They searched shipwrecks and made underwater movies. He eventually won three Academy Awards for his undersea films. He also wrote many books about sea life. He worked very hard to teach people about the sea and how to take care of it.

Directions: Complete these statements about Jacques Cousteau.

1. Jacques Cousteau was born in _____
2. As a boy, Cousteau liked to swim and to _____
3. Cousteau's ship was called _____
4. Cousteau's undersea films won him _____

One part of the world is still largely unexplored. It is the deep sea. For the years, many people have explored the sea. But the first deep-sea divers wanted to find sunken treasure. They weren't really interested in studying the creatures or life there. Only recently have they begun to learn some of the mysteries of the sea.

It is not easy to explore the deep sea. A diver must have a way of breathing under water. He must be able to protect himself from the terrific pressure. The pressure of air is about 15 pounds on every square inch. But the pressure of water is about 1,300 pounds on every square inch!

The first diving suits were made of rubber. They had a helmet of brass with windows in it. The weights were made of lead and weighed 20 pounds each! These suits let divers go down a hundred feet, but they were no good for reaching very deep waters. With a metal diving suit, a diver could go down 700 feet. Metal suits were first used in the 1930s.



In 1937, a diver named William Beebe wanted to explore deeper than anyone had ever gone before. He was not interested in finding treasure. He wanted to study deep-sea creatures and plants. He built a hollow metal ball called the *bathysphere*. It weighed more than 10,000 pounds, but in it Beebe went down 3,028 feet. He saw many things that had never been seen by humans before.

Questions: Answer these questions about early deep-sea diving.

1. What were the first deep-sea divers interested in?

2. What are two problems that must be overcome in deep-sea diving?

a. _____

b. _____

3. How deep could a diver go wearing a metal suit? _____

4. Who was the deep-sea explorer who invented the bathysphere?
