Lesson 4-1 – Introduction & Representing Polynomials with Algeblocks

Objectives:

- Students will divide positive integers from the multiplication table without remainders, as evidenced by them passing one-minute quizzes.
- Students will simplify the repeated sum or multiplication of a variable, as evidenced by them completing a warm-up worksheet where they do so.
- Students will construct a concept of polynomials, as evidenced by them examining examples and non-examples, and answering questions on the note taking guide.
- Students will represent polynomials with Algeblocks, as evidenced by them completing an in-class lab and a homework assignment where they do so.

Materials:

- "Minute Quiz 4-1" for each student
- "Warm-up 4-1" for each student
- "Category Total Reports" grade check for each student
- "Warm-up & Notes Checker" for each student
- "Unit 4 Calendar" transparency
- Packet of "Notes 4-1" (student edition), "Lab 4-1", and "Homework 4-1" for each student.
- "Notes 4-1" (student edition) transparency and "Lab 4-1" transparencies
- "Notes 4-1" (teacher's edition)
- Algeblocks class sets

Do Now:

- Park stuff
- Work on warm-up
- Get ready for minute quiz

Homework:

- Homework #4-1
- 3 hours of ALEKS due Friday

Time	Activity
Before Bell	**AGENDA, DO NOW, AND WARM-UPS** Write the **agenda** and the **do now** on the board. As students enter the classroom, shake their hands, give them a copy of the **warm-up**, and direct them to follow the directions listed for the "do now."
10 min	**MINUTE QUIZ, WARM-UPS, ATTENDANCE, AND HOMEWORK COLLECTION** **Minute Quiz and Warm-up** When the bell rings, quickly go around and put the **minute quiz** on each student's desk, face down. Then, start everyone on the quiz at the same time and give everyone one minute. While students are working on the quiz, pass out new **warm-up & notes checkers** for the week. Students should work on the warm-up when they're done with the minute quiz. After the minute is over, have a student collect the minute quizzes and give them to the teacher's aide (TA) to grade. **Attendance and Collect Homework** While students work on the warm-up, take **attendance** and have the TA collect **homework** & stamp homework checkers.
5 min	**ANNOUNCEMENTS** Explain to students that you have a couple announcements to make. **Unit 3 Comprehensive Test** Say: *The first announcement has to do with the unit test that you took on Friday. I graded them over the weekend, and I'll hand them back at the end of the period.* Point to the last agenda item that indicates passing back the tests when we clean up. **Unit Overview** Say: *The second announcement I have is about the new unit that we're starting today on polynomials.* Put the **unit 4 calendar** transparency on the overhead so that students can see it. Point out the current date on the calendar. Also, point out Spring Break, Spirit Week, and STAR Testing since students will immediately be drawn to Spring Break. Explain to students the general flow of the unit

	and how today's lesson fits in (that we need to first talk about what polynomials are, and how to represent polynomials using Algeblocks so that we can add, subtract, multiply, and divide them).
10 min	**NOTES: INTRODUCTION TO POLYNOMIALS** Using the notes transparency, lead students to construct the concept of polynomials. Also, motivate the power of Algeblocks so that students do not find them boring or stupid.
20 min	**ALGEBLOCKS LAB: REPRESENTING POLYNOMIALS** **Establishing Norms** Make sure students understand that Algeblocks are tools and not toys. Students who are misusing the Algeblocks in any way, especially throwing them, will have to sit alone away from the rest of the class and complete the work without the blocks. If misuse occurs a second time, the student will have to work without blocks for the rest of the unit. **Free Time with the Algeblocks** Explain that you'll give students two minutes to fiddle with the blocks, and that you will count down at the end of the two minutes. When you count down, all the blocks will need to be "earthquake safe." Pass out the containers of Algeblocks so that two students share a set. Give students two minutes to play with the Algeblocks. **Naming the Algeblocks using Area** Go through the first page of Lab 4-1 to name the Algeblocks. You have a transparency for this. **Representing Polynomials using Algeblocks** Go through the second page of Lab 4-1 to represent polynomials using Algeblocks. You have a transparency for this.
20 min	**ALEKS** After all Algeblocks have been put away, dismiss students by column to get laptops for ALEKS.
5 min	**CLEAN UP & PASS BACK TESTS** Students must check the laptops with the teacher or the TA before putting them away. After putting the laptops away, students should pack up, sit in their seats, and wait to be dismissed by the teacher (not by the bell). During this time, pass back the unit 3 comprehensive tests that they took last Friday.

Numeracy
Minute Quiz 4-1 A

Name:
Date: Period:

Solve the following division problems. You have exactly one minute!

12 ÷ 3 =	63 ÷ 9 =	90 ÷ 9 =
10 ÷ 2 =	80 ÷ 10 =	1 ÷ 1 =
21 ÷ 3 =	7 ÷ 1 =	7 ÷ 1 =
36 ÷ 12 =	28 ÷ 4 =	28 ÷ 4 =

Numeracy
Minute Quiz 4-1 A

Name:
Date: Period:

Solve the following division problems. You have exactly one minute!

12 ÷ 3 =	63 ÷ 9 =	90 ÷ 9 =
10 ÷ 2 =	80 ÷ 10 =	1 ÷ 1 =
21 ÷ 3 =	7 ÷ 1 =	7 ÷ 1 =
36 ÷ 12 =	28 ÷ 4 =	28 ÷ 4 =

Numeracy
Minute Quiz 4-1 A

Name:
Date: Period:

Solve the following division problems. You have exactly one minute!

12 ÷ 3 =	63 ÷ 9 =	90 ÷ 9 =
10 ÷ 2 =	80 ÷ 10 =	1 ÷ 1 =
21 ÷ 3 =	7 ÷ 1 =	7 ÷ 1 =
36 ÷ 12 =	28 ÷ 4 =	28 ÷ 4 =

Numeracy
Minute Quiz 4-1 B

Name:
Date: Period:

Solve the following division problems. You have exactly one minute!

20 ÷ 4 =	35 ÷ 7 =	5 ÷ 1 =
12 ÷ 3 =	4 ÷ 1 =	7 ÷ 7 =
99 ÷ 11 =	24 ÷ 8 =	28 ÷ 7 =
40 ÷ 10 =	81 ÷ 9 =	32 ÷ 4 =

Numeracy
Minute Quiz 4-1 B

Name:
Date: Period:

Solve the following division problems. You have exactly one minute!

20 ÷ 4 =	35 ÷ 7 =	5 ÷ 1 =
12 ÷ 3 =	4 ÷ 1 =	7 ÷ 7 =
99 ÷ 11 =	24 ÷ 8 =	28 ÷ 7 =
40 ÷ 10 =	81 ÷ 9 =	32 ÷ 4 =

Numeracy
Minute Quiz 4-1 B

Name:
Date: Period:

Solve the following division problems. You have exactly one minute!

20 ÷ 4 =	35 ÷ 7 =	5 ÷ 1 =
12 ÷ 3 =	4 ÷ 1 =	7 ÷ 7 =
99 ÷ 11 =	24 ÷ 8 =	28 ÷ 7 =
40 ÷ 10 =	81 ÷ 9 =	32 ÷ 4 =

Numeracy
Minute Quiz 4-1 C

Name:
Date: Period:

Solve the following division problems. You have exactly one minute!

110 ÷ 10 =	72 ÷ 9 =	12 ÷ 4 =
24 ÷ 12 =	32 ÷ 8 =	10 ÷ 1 =
77 ÷ 7 =	36 ÷ 12 =	14 ÷ 2 =
12 ÷ 1 =	55 ÷ 5 =	66 ÷ 11 =

Numeracy
Minute Quiz 4-1 C

Name:
Date: Period:

Solve the following division problems. You have exactly one minute!

110 ÷ 10 =	72 ÷ 9 =	12 ÷ 4 =
24 ÷ 12 =	32 ÷ 8 =	10 ÷ 1 =
77 ÷ 7 =	36 ÷ 12 =	14 ÷ 2 =
12 ÷ 1 =	55 ÷ 5 =	66 ÷ 11 =

Numeracy
Minute Quiz 4-1 C

Name:
Date: Period:

Solve the following division problems. You have exactly one minute!

110 ÷ 10 =	72 ÷ 9 =	12 ÷ 4 =
24 ÷ 12 =	32 ÷ 8 =	10 ÷ 1 =
77 ÷ 7 =	36 ÷ 12 =	14 ÷ 2 =
12 ÷ 1 =	55 ÷ 5 =	66 ÷ 11 =

Numeracy
Warm-up 4-1

Name:
Date: Period:

Simplify the following expressions.

Ex. $x + x + x + x + x + x + x =$ _7x_

Ex. $y \cdot y \cdot y \cdot y \cdot y =$ _y^5_

1. $a \cdot a \cdot a =$ ____

2. $k + k + k + k =$ ____

3. $z + z =$ ____

4. $h \cdot h =$ ____

5. $t \cdot t \cdot t \cdot t =$ ____

6. $b \cdot b \cdot b \cdot b \cdot b \cdot b \cdot b \cdot b =$ ____

7. $r + r + r + r + r + r + r =$ ____

8. $p \cdot p \cdot p \cdot p \cdot p =$ ____

9. $c + c + c =$ ____

10. $e + e + e + e + e =$ ____

11. $q \cdot q \cdot q \cdot q \cdot q \cdot q \cdot q \cdot q =$ ____

12. $y + y + y + y + y + y + y + y + y =$ ____

13. $x + x + x + x + x + x + x + x =$ ____

14. $i \cdot i \cdot i \cdot i \cdot i \cdot i =$ ____

15. $j \cdot j \cdot j \cdot j \cdot j \cdot j \cdot j =$ ____

16. $g + g + g + g + g + g =$ ____

Numeracy
Warm-up 4-1

Name:
Date: Period:

Simplify the following expressions.

Ex. $x + x + x + x + x + x + x =$ _7x_

Ex. $y \cdot y \cdot y \cdot y \cdot y =$ _y^5_

1. $a \cdot a \cdot a =$ ____

2. $k + k + k + k =$ ____

3. $z + z =$ ____

4. $h \cdot h =$ ____

5. $t \cdot t \cdot t \cdot t =$ ____

6. $b \cdot b \cdot b \cdot b \cdot b \cdot b \cdot b \cdot b =$ ____

7. $r + r + r + r + r + r + r =$ ____

8. $p \cdot p \cdot p \cdot p \cdot p =$ ____

9. $c + c + c =$ ____

10. $e + e + e + e + e =$ ____

11. $q \cdot q \cdot q \cdot q \cdot q \cdot q \cdot q \cdot q =$ ____

12. $y + y + y + y + y + y + y + y + y =$ ____

13. $x + x + x + x + x + x + x + x =$ ____

14. $i \cdot i \cdot i \cdot i \cdot i \cdot i =$ ____

15. $j \cdot j \cdot j \cdot j \cdot j \cdot j \cdot j =$ ____

16. $g + g + g + g + g + g =$ ____

Numeracy Name:
Notes #4-1 – Introduction to Polynomials Date: Period:

What's a Polynomial?

To explain what a polynomial is, let's look at some _____ and _____:

Polynomials	Not Polynomials

State whether each expression is a polynomial. If not, explain why.

1. $2xy + x + 3y + 2x^2$	**2.** $(x+1)^{3/2}$
3. x^2	**4.** 2^x

Overview of the Unit

In this ____, we will use _____ to ____, _____, _____, and _____ polynomials. Here are some examples of problems we will do:

Adding Polynomials:	
Subtracting Polynomials:	
Multiplying Polynomials:	
Dividing Polynomials:	

You may find Algeblocks _____ or _____ at first, but believe me, they are extremely _____! By the end of the unit, you will be able to use Algeblocks to evaluate crazy expressions like:

$$\frac{x^2 - 3x - 4}{x + 1} - \frac{2x^2 - 11x + 5}{2x - 1}$$

Pretty cool, eh? By the way, the answer to that crazy problem is ___.

Numeracy | Name: **Teacher's Edition**
Notes #4-1 – Introduction to Polynomials | Date: Period:

What's a Polynomial?

To explain what a polynomial is, let's look at some examples and non-examples:

Polynomials	Not Polynomials
7	$\sqrt{x}$
$-5x$	2^x
$3x^2$	$x^{3/2}$
$3x^2 - 5x + 7$	$\frac{1}{x^2+1}$
$6x^2y$	$(5+y)^x$
$5xy + 2y^2 + x^2 + x + 5$	
$(x+1)^3$	

State whether each expression is a polynomial. If not, explain why.

1. $2xy + x + 3y + 2x^2$ Yes.	**2.** $(x+1)^{3/2}$ No. Cannot have an exponent of 3/2.
3. x^2 Yes.	**4.** 2^x No. Cannot have exponent of x.

Overview of the Unit

In this unit, we will use Algeblocks to add, subtract, multiply, and divide polynomials. Here are some examples of problems we will do:

Adding Polynomials:	$(2x-5) + (x+3)$
Subtracting Polynomials:	$(2x^2-3) - (3x^2+4)$
Multiplying Polynomials:	$(2x-3) \cdot (x+1)$
Dividing Polynomials:	$(2xy-4x) \div (y-2)$

You may find Algeblocks boring or stupid at first, but believe me, they are extremely powerful tools! By the end of the unit, you will be able to use Algeblocks to evaluate crazy expressions like:

$$\frac{x^2-3x-4}{x+1} - \frac{2x^2-11x+5}{2x-1}$$

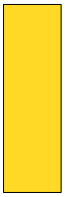
Pretty cool, eh? By the way, the answer to that crazy problem is 1.

Numeracy Name:
Lab 4-1 – Representing Polynomials with Algeblocks Date: Period:

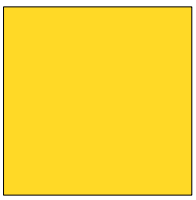
Find the area of each Algeblock by multiplying together the width and height.

1. Green Square 

Area: _____ × _____ = _____
(width) (height)

2. Yellow Rectangle 

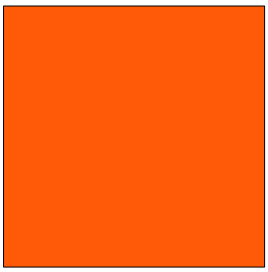
Area: _____ × _____ = _____
(width) (height)

3. Yellow Square 

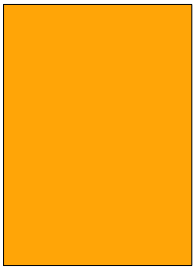
Area: _____ × _____ = _____
(width) (height)

4. Orange Rectangle 

Area: _____ × _____ = _____
(width) (height)

5. Orange Square 

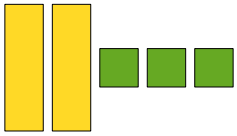
Area: _____ × _____ = _____
(width) (height)

6. Light Orange Rectangle 

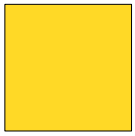
Area: _____ × _____ = _____
(width) (height)

Write the polynomial represented by each set of Algeblocks.

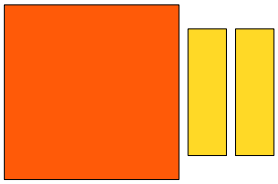
7. _____



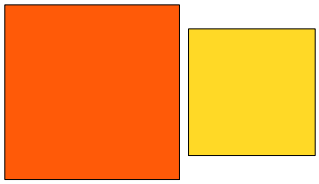
8. _____



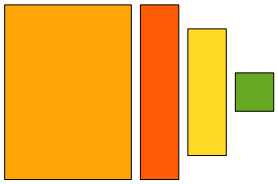
9. _____



10. _____



11. _____



12. _____

Represent each polynomial using Algeblocks. Sketch (draw) what they look like.

13. $3x^2 + 4y$

14. $4y^2 + 2y$

15. $3 + 2x^2 + 3y^2$

16. $3x + xy + 2x^2$

17. $2xy + x + 3y + 2x^2$

18. $2x^2 + 3y^2 + 2xy + 4$

Numeracy
Homework 4-1 – Intro & Representing Polynomials

Name:
Date: Period:

State whether each expression is a polynomial. If not, explain why.

1. $x + 2$

2. 2^x

3. $x^{1.2}$

4. x^2

Match each name with the correct Algeblock.

5. 1 _____

6. x _____

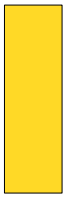
7. y _____

8. xy _____

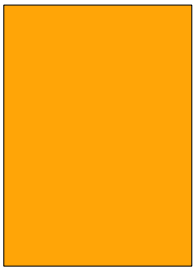
9. $x^{\text{٢}}$ _____

10. y^2 _____

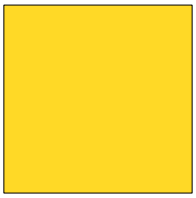
a.



b.

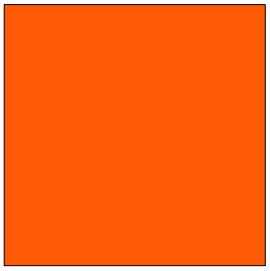


c.



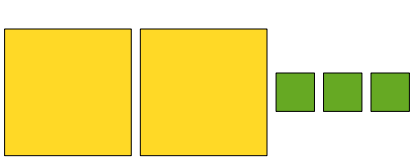
d.

e.

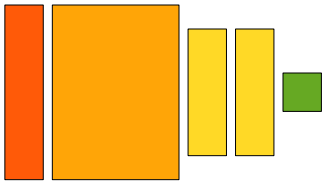


f.

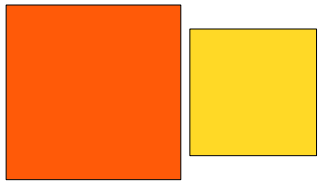
Write the polynomial represented by each set of Algeblocks.



7. _____



8. _____



9. _____

Represent each polynomial using Algeblocks. Sketch (draw) what they look like.

13. $2y^2 + 3xy + 2$

14. $3x^2 + xy + 2y^2 + x + 4y$