1.2 Powers*I can write and understand numerical expressions involving
and Exponentsand Exponentswhole number exponents.

Discuss with your group – how do you THINK you would find the value?					
			4 ⁵		
Exponential F	orm [.]	exp	onent		
	<u> </u>	24 - 0		repeated mu	Itiplication
	base	→ Z · = Z •	Z•Z•Z+		
Exponential	Repeated	k	Word	Form	Value
Form	Multiplicati	on			
2 ²	2 x 2	Two Two	squared to the second p	ower	4
2 ³	2 x 2 x 2	Two	cubed		8
		Two	to the third pow	er	
2 ⁴	2 x 2 x 2 x	2 Two	to the fourth po	wer	16
2 ⁵	2 x 2 x 2 x 2	x 2 Two	to the fifth powe	er	32
Write in exponer	ntial form.				
9 x 9	9 ²	3 x 3 x 3 x 3 3	x 3 ⁵	15 x 15 x 15	15 ³
			I	1	
Find the value.					
5 ²	25	4 ³	64	124	20,736
Calculator Connect	cion:				
6 x 6 x	x 6 = 6 ^ 3 =				
Perfect Squares: 1•1=					
			1^2 3×3	4 x 4	5 X 5
			1 3 ² 9	16	25
Determine whether	er the number is a	perfect square	<u>.</u>		
8	No	4	Yes	25	Yes

Use exponents to complete the table. Describe the pattern.

10 10 ¹	100 10 ²	1000 10 ³	10,000 <mark>10</mark> 4	100,000 <mark>10</mark> 5	1,000,00 0 <mark>10</mark> ⁶	Why would we name this pattern a "base 10 pattern"?
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Unit One – Algebraic Thinking (Part A – Number Relationships)	
1.3 Order of	*I can use my knowledge of order of operations to evaluate
Operations	expressions.

Discuss with your group – how do you THINK you would evaluate?

6 + 20 ÷ 2

Numeric Expression = an expression that contains only numbers and operations.

Evaluate = find the value

Order of Operations = a set of rules to evaluate numeric expressions.

 Parenthesis Exponents Multiply or Divide (What's first?) Add or Subtract (What's first?) 		Remember to solve using Order of Operations: • Underline! • Answer! • Re-copy!	
1. 7 + <u>4 • 3</u>	2. (32 - 20) ÷ 4	3 <u>.</u> 5 • 3 ² - 10 + 7	
7 <u>+12</u>	1 <u>2 ÷ 4</u>	<u>5 • 9</u> - 10 + 7	
19	3	4 <u>5 - 1</u> 0 + 7	
		3 <u>5 + 7</u>	
		42	
Calculator Connection:			
Your calculator will evaluate order of operations expressions.			
4. 5 + 18 ÷ 6	8 5. (*	$11 - 3) \div 2 + 3^2$ 13	

	Ŭ		10
6. 42 ÷ (15 - 2 ³)	6	7. 9 ² - 8(6 ÷2)	57

Expressions expressions when solving real-world problems.

Discuss with your group – how do you THINK you would write an expression?

twice a number m

Operation	Addition	Subtraction	Multiplication	Division
Key Words and Phrases	added to plus sum of more than increased by total of and	subtracted from minus difference of less than decreased by fewer than take away *(from and than mean switch the order)	multiplied by times product of twice of	divided by quotient of
Numerical Expression	8 + 2	8 - 2	8 x 2 8 • 2 8(2) (8)2 (8)(2)	$8 \div 2 \frac{8}{2}$
Algebraic Expression	8+a	m - 2	k • 2 2k k(2) (k)2 (k)(2)	$k \div 2 = \frac{k}{2}$

Write the phrase as an expression

1) 5 less than 9	2) the difference of a number k and 5	3) twice a number t	<i>4)</i> a number n cubed
9 – 5	k – 5	2 t	n ³

5)

Four friends share the total cost of a dinner equally, including the tax and tip. Let d represent the total cost of the dinner. Write an expression for the cost per person.

d ÷ 4

6)	7)	<i>8)</i>	<i>9)</i>
15 subtracted from	a number h	the sum of a	20 times a number
a number x	squared	number z and 12	r
x - 15	h²	z + 12	20 r

Unit One – Algeb	oraic Thinking (Part A – Number Relationships)
3.1 Algebraic	*I can use variables to represent numbers and write
Expressions	expressions.
	*I can identify the parts of an expression using mathematical
	terms.
	*I can determine the answer to expressions when given the
	specific value of a variable.

Discuss with your group – how do you THINK you would evaluate?

Evaluate d - 17 when d = 30

Algebraic Expression = an expression that contains numbers, variables, and operations.

Terms = parts of an algebraic expression

Variable = symbol that represents a number

Coefficient = numerical factor with a variable

Constant = term without a variable

Write each expression using exponents.

	Terms	
5I	$x^2 + \dot{m} + 1$	5
Coefficient	Variables	Constant

 $d \cdot d \cdot d \cdot d$ $7 \cdot h \cdot h \cdot h$ Because d is used as a factor 5 times,
its exponent is 5. $7h^3$ d^5 $7h^3$

To evaluate an algebraic expression, substitute a number for each variable. Then use the order of operations to find the value of the numerical expression.

1)	2)	3)
Evaluate n + 10 when n = 7.	Evaluate $4 \cdot \mathbf{h}$ when $h = 8$.	Evaluate the expression below
n + 10	4 • h	when $y = 3$.
7 + 10	4 • 8	y ² + 7
17		<mark>3² + 7</mark>
17	32	<mark>9</mark> + 7
		16

Simplify (+ or -) by combining "like terms" (same variable to the same power)

$$10m^2 + 8m + 9 - 3m = 10m^2 + 5m + 9$$

Unit One – Algebraic Thinking (Part A – Number Relationships)		
3.3 Properties	*I can use properties of addition and multiplication to write	
of Addition and	equivalent expressions.	
Multiplication		

Discuss with your group – how do you THINK you would simplify an expression? (t + 15) + 9

Commutative Property:

Words: Changing the order of addends or factors does not change the sum or product. **Numbers:** 5 + 8 = 8 + 5 $5 \cdot 8 = 8 \cdot 5$ **Algebra:** a + b = b + a $a \cdot b = b \cdot a$

Associative Property:

Words: Changing the grouping of addends or factors does not change the sum or product.

Numbers: $(7 + 4) + 2 = 7 + (4 + 2)$	Algebra:	(a + b) + c = a + (b + c)
$(7 \cdot 4) \cdot 2 = 7 \cdot (4 \cdot 2)$		(a • b) • c = a • (b • c)

Addition Property of Zero:

Words:The sum of any number and 0 is that number.Numbers:7 + 0 = 7Algebra:a + 0 = a

Multiplication Property of Zero and One:

Words:	The product of any number and	0 is 0.	
	The product of any number and	1 is that number.	
Numbers:	$9 \bullet 0 = 0$	Algebra:	a•0=0
	4 • 1 = 4		b • 1 = b

Simplify the expression using the properties. Explain each step.

2)	3)
12 • b • 0	5(4n)
Comm(x): 12 • 0 • b	Assoc(x): (5•4)n
Zero(x): 0 • b	20n
0	
	2) 12 • b • 0 Comm(x): 12 • 0 • b Zero(x): 0 • b 0

Identity Property of Addition = <u>same as</u> Addition Property of Zero

Identity Property of Multiplication = <u>same as</u> Multiplication Property of One

Unit One – Algebraic Thinking (Part A – Number Relationships)		
3.4 Distributive	*I can use the distributive property to show the sum of two	
Property	whole numbers 1-100 in different ways.	

Discuss with your group – how do you THINK you would simplify an expression?

3(d – 11)

Distributive Property:

Words: To multiply a sum or difference by a number, multiply each number in the sum or difference by the number outside the parentheses. Then evaluate.

Numbers: 3 • 72

 $3(70+2) = 3 \cdot 70 + 3 \cdot 2$

Algebra:

a(b + c) = ab + ac

Use the Distributive Property and mental math to find the product.

1) 3 x 24	2) 8 x 32	3) 7(88)	4) 8(45)
(24 is same is 20 + 4)	(32 is same as 30 + 2)	(88 is same as 90 – 2)	(45 is same as 50 – 5)
3 <mark>(20 + 4)</mark>	8 <mark>(30 + 2)</mark>	7 <u>(</u> 90 – 2)	8 <u>(</u> 50 – 5)
		E D	
60 + 12	240 + 16	630 – 14	400 – 40
72	256	616	360

Use the Distributive Property to simplify the expression.

5) 5(x + 9)	<i>6)</i> 12(8 - m)	7) 7(10 + 2z)	8) 3(m + 4 + 7t + 2m)
5x + 45	96 – 12m	70 + 14z	3m + 12 + 21t + 6m
			Comm. Prop. (+) 3m + 6m + 21t + 12
			(Combine like terms) 9m + 21t + 12

Unit One – Algebraic Thinking (Part A – Number Relationships)		
3.4 Ext. Factoring	*I can write equivalent expressions by finding a common	
Expressions	factor of two numbers.	

Discuss with your group – how do you THINK you would factor an expression? 40m - 16

Factoring an expression = writing an expression as a product of factors.

(Opposite of Distributive Property)

Factor the expression using the GCF.

1)	2)	3)	4)
<u>7</u> + <u>14</u>	<u>44 – 11</u>	<u> 18 – 12</u>	<u>70</u> + <u>98</u>
77	11 11	6 6	77
7(1 + 2)	11(4 – 1)	6(3 - 2)	7(10 + 14)

Factor the expression using the GCF. Make sure to divide the variable!

5) 2: 2	$\frac{x}{2} + \frac{10}{2}$	6) <u>15x</u> + <u>6</u> <u>3</u> <u>3</u>	7) $\frac{26x}{13} + \frac{13}{13}$	8) <u>50x</u> – <u>60</u> 10 10
	2(1x + 5)	3(5x + 2)	13(2x + 1)	10(5x – 6)
	2(x+5)			

<u> </u>	
7.1 Writing	*I can use a variable to represent a quantity in a real world
Equations in One	problem and write an equation to express the quantity.
Variable	

Discuss with your group – how do you THINK you would write the equation? 11 is the quotient of a number h and 6

Equation = a mathematical sentence that uses an equal sign (=) to show that two expressions are the same.

Expressions	Equations	
4 + 8	4 + 8 = 12	
x + 8	x + 8 = 12	

Write the word sentence as an equation.

The <mark>sum of a number m and 8</mark> is <mark>23</mark> .	<mark>m + 8</mark> <mark>=</mark> 23
A number <mark>12 taken from k</mark> is <mark>75</mark> .	<mark>k – 12</mark> <mark>= 75</mark>
70 times a number r <mark>is</mark> 175.	<mark>70r =</mark> 175

Write the word sentence as an equation.	
2) The sum of a number f and 4 equals 17.	3) A number y decreased by 10 is 7.
f + 4 = 17	y - 10 = 7
4) 14 is the quotient of a number 70 and h.	5) 5 is one-fourth of a number t.
14 = 70 ÷ h	$5 = \frac{1}{4} t$