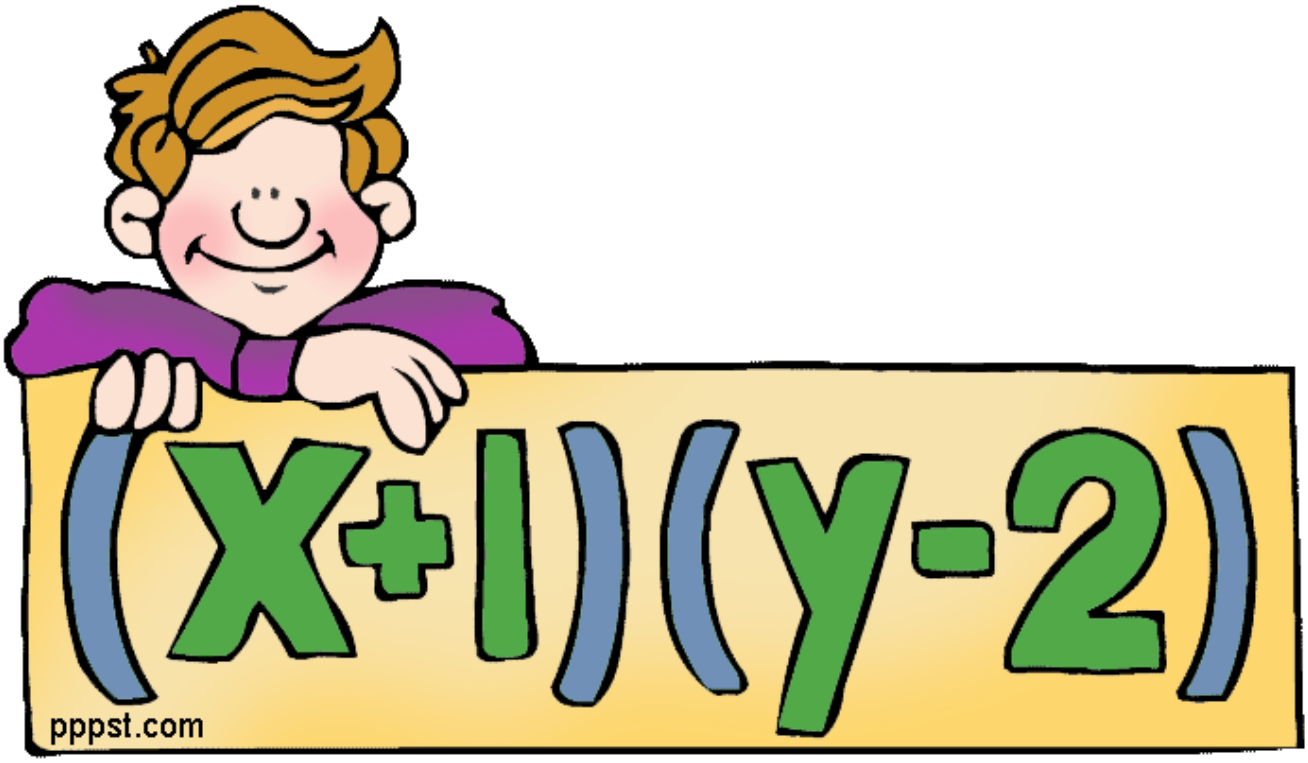
Earle B. Wood Middle School
Summer Math Packet



For Students Entering Math 8 and Algebra 1

This summer math booklet was developed to provide students an opportunity to review math objectives and to improve math performance.

Summer

Student Responsibilities

Students will be able to improve their own math performance by:

- Completing the summer math booklet
- Reviewing math skills throughout the summer.

Student Signature	Grade	Date

Parent or Guardian Responsibilities

Parents will be able to promote student success in math by:

- Asking students to explain why their answers are correct,
- Monitoring student completion of the summer math booklet,
- Talking about the concepts with students and listening to student questions and comments.

Parent Signature	Date

Algebra 1 Summer Mathematics Packet

Table of Contents

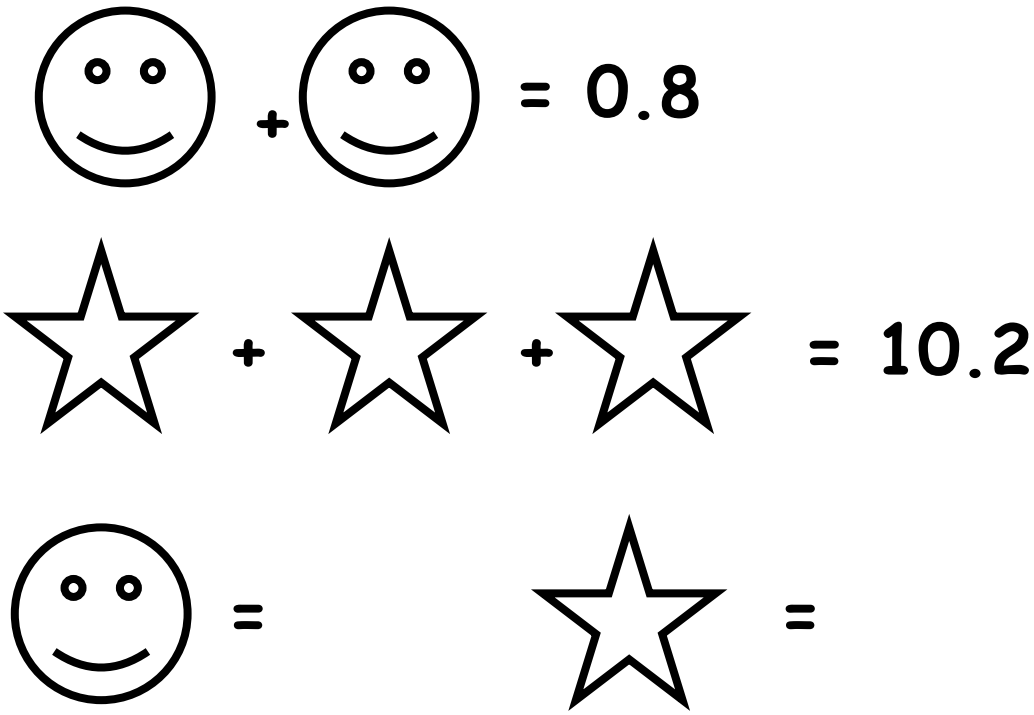
Page	Objective

On ALL pages of this review, calculators may be used. Students and Parents should be aware that in many cases a calculator will be a helpful tool, but will not replace the student's role in determining the answers.

Decimal Operations

Tasks: Each task requires students to use what they know of operations with fractions to determine the missing values.

Task #1:



Task #2:

Jen, Terry, Cheryl, Ben, and Aaron have spare change in their pockets. Each person has a different amount: $9.38, $7.52, $3.62, $4.73 and $1.27.

Together, Terry and Aaron have $10.65.
Together, Terry and Ben have $13.00.
Together, Cheryl and Aaron have $6.00.
Doubled, Cheryl will have $9.46

Jen has _____ Terry has _____ Cheryl has _____
Ben has _____ Aaron has _____

Need help?
https://www.khanacademy.org/math/cc-seventh-grade-math/cc-7th-fractions-decimals

Fraction Operations

Directions: For each section a number bank is provided. Using the numbers from the bank only once, complete the missing parts of each equation.

Task #1

Number Bank for Task #1								
1	2	3	4	5	6	7	8	9

$$\frac{\square}{\square} \div \frac{\square}{\square} = 6 \qquad \frac{7}{\square} \times \frac{\square}{\square} = \frac{5}{2}$$

$$\frac{\square}{\square} \times \frac{6}{5} = \frac{1}{5}$$

Task #2

Number Bank for Task #2									
0	1	2	3	4	5	6	7	8	9

$$\frac{\square}{\square} + \frac{\square}{\square} = 3 \qquad \frac{\square}{\square} - \frac{\square}{20} = 0 \qquad \frac{\square}{\square} + \frac{4}{18} = 1$$

Need help?
https://www.khanacademy.org/math/cc-seventh-grade-math/cc-7th-fractions-decimals

Order of Operations

When evaluating numeric expressions, we complete the mathematical operations in a set order: **Parenthesis, Exponents, Multiplication and Division, Addition and Subtraction** (**PEMDAS**). Use the order of operations to answer each question.

Example 1: Determine the smallest non-negative number that you can make from 2, 3, 5, 7, and 11. You may only use each operation (+, -, x, ÷) once.
Response: [(11 + 3) – (2 x 7)] / 5 = 0

Example 2: Using 1, 7, 8, 9, and 9 create a problem in which the answer equals 16. You may use operations more than once.
Response: (9 ÷ 9) x (7 + 8 + 1) = 16

1. Using 1, 3, 5, 9, and 9 create a problem in which the answer equals 5. You may use operations more than once.

2. Using 8, 11, 9, 1, and 8 create a problem in which the answer equals 2. You may use operations more than once.

3. Using 4, 16, 10, 24, and 25 create a problem in which the answer equals 1. You may use operations more than once.

Need help?
https://www.khanacademy.org/math/cc-sixth-grade-math/cc-6th-factors-and-multiples/cc-6th-order-operations/v/introduction-to-order-of-operations

Laws of Exponents

Adding powers	$a^m a^n = a^{m+n}$
Multiplying powers	$(a^m)^n = a^{mn}$
Subtracting powers	$\frac{a^m}{a^n} = a^{m-n}$
Negative powers	$a^{-n} = \frac{1}{a^n}$
To the zero power	$a^0 = 1$

Exercises: Simplify the following problems using exponents (Do not multiply out).

EX #1: $2^3(2^7) = 2^{10}$ EX #2: $(2^3)^7 = 2^{21}$ EX #3: $2^7 \div 2^3 = 2^4$

1. $4^4(4^5) =$

2. $(4^4)^5 =$

3. $x^3y^7(x^4y^6) =$

4. $9^4(9^{-10}) =$

5. $9^4(9^{-10})\ 9^6 =$

6. $x^{21}y^4 \div x^3y^2 =$

For the next set, fill each blank with an exponent or exponents that would make the equation true.

7. $4^{\square}(4^5) = 4^{10}$

8. $(4^4)^{\square} = 4^{16}$

9. $x^{\square}x^{\square} = x^{30}$

10. $(x^{\square})^{\square} = x^{48}$

11. $9^{\square}(9^{\square})\ 9^{\square} = 9^{24}$

12. $((9^{\square})^{\square})^{\square} = 9^{24}$

13. For what values of n will $(2^n)^n < (2^n)(2^n)$? Give examples of those values in your explanation.

Need help?
https://www.khanacademy.org/math/algebra/exponent-equations/exponent-properties-algebra/v/exponent-properties-1

Perfect Squares Roots and Square Roots

Task #1: In this task you will be given clues about particular perfect squares and square roots. Using the clues name the perfect square.

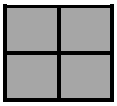
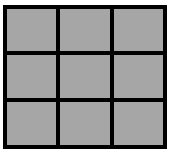
EXAMPLE: Doubled, my value is -12, but my product is the 36. What number am I? -6

1. Doubled, my value is 18, but my product is 81. What number am I? ____

2. Doubled, my value is 22, but my product is 121. What number am I? ____

3. Doubled, my value is 16, but my product is 64. What number am I? ____

Task #2: Complete the table below. In the table you must complete the area diagram, the equivalent expression, the exponent form and the value.

Area Model	Equivalent Expression	Exponential Form	Value
	2 x 2	2^2	4
			
	5 x 5		
			16
		6^2	

Integer Operations: Addition and Subtraction of Integers

Laws for Addition and Subtraction of Integers:

Ex #1: 4 + -3 = 4 - 3 = 1 Ex #2: 4 + -5 = 4 - 5 = -1

Ex #3: -4 + -5 = -9 Ex #4: -4 + 5 = 1

Ex #5: 4 - -5 = 4 + 5 = 9 Ex #6: -4 - -5 = -4 + 5 = 1

Task: Determine the value (or values) of *n* that would satisfy the equation.

Example: *n* – 4 = a negative number.

Response: N must be a number less than 4. If n is 4 or more, the answer is not negative. For example 5 - 4 = +1 and 4 – 4 = 0. But is we use a number less than 4, it will be negative. For example 3 - 4 = -1 and -2 – 4 = -6.

1. *n* + 4 = a negative number.

2. 9 – *n* = a positive number.

3. For what values of *a* is a > a + a? In your answer give examples of values of *a* which make the inequality true.

4. For what values of *n* is 4 – n > n? In your answer give examples of values of *n* which make the inequality true.

Need help?
https://www.khanacademy.org/math/cc-seventh-grade-math/cc-7th-negative-numbers

Integer Operations: Multiplication and Division of Integers

Laws for Addition and Subtraction of Integers:

Ex #1: 4(-3) = -12 Ex #2: -4(-3) = 12
Ex #3: -10 ÷ 5 = -2 Ex #4: -10 ÷ -5 = 2

Task: Determine the values of *n* that would satisfy the equation.

Example: -6n = some positive number.

Response: In order for -6n to be a positive number, n must be any negative number. The product of two negatives is always positive. For example, -6(-2) = +12. If n is a positive number, the product would still be negative. Therefore, n must be negative to get a positive answer.

1. -4n = some negative number.

2. -4n = some positive number that is greater than 28.

3. 100 ÷ n = some negative number between -20 and -1

4. $(-3)^n$ = a positive number.

5. For what values of *a* is -2a > a? In your answer give examples of values of *a* that make the inequality true.

Need help?
https://www.khanacademy.org/math/cc-seventh-grade-math/cc-7th-negative-numbers

Solving Equations

Task #1: Solve the following problems. SHOW ALL WORK. Use a separate sheet of paper (if necessary) and staple to this page.

1. $-4h - 6 = 22$
2. $\frac{m}{-5} + 6 = -4$
3. $-25 = -4r + 5$
4. $6 = -7 + \frac{x}{-3}$
5. $5g - 3 = -12$

Task #2: For each equation, determine if the equation is always true, never true or sometimes true. If the equation is sometimes true, determine the numbers that make it true.

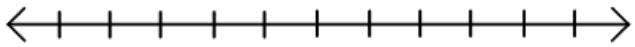
6. $6y + 5 = 4y + 5$
7. $5x + 8 = 8 + 5x$
8. $7p - 8 = 7p + 6$
9. $x^2 = 100$
10. $-2(6 - 10n) = 10(2n - 6)$
11. $7(1 - y) = -3(y - 2)$

Need Help?
https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-solving-equations

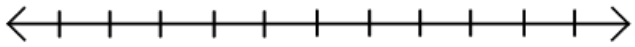
Inequalities

Task #1. Solve each inequality and then graph the solution set on the number line. Remember that when multiplying or dividing by negative numbers, you must reverse the inequality.

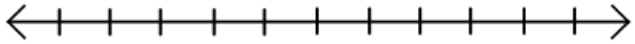
1. $13 < 9 + 2x$



2. $-2x + 5 \geq -12$



3. $\frac{1}{4}x + 9 < 2$



Task #2:

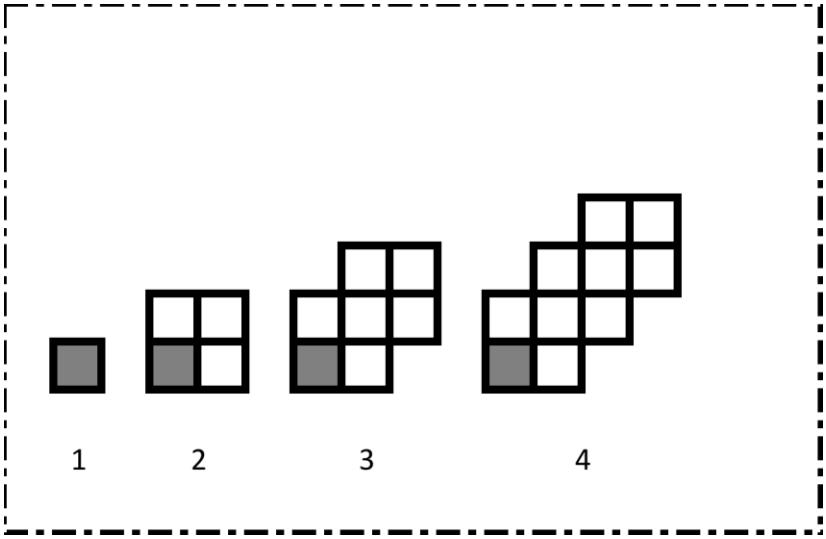
4. Given: $A > 0$ and $B < 0$. Is $A < A(B)$?

5. Given: $5 > 4$. For what values of x is $5x > 4x$?

Need Help?
https://www.khanacademy.org/math/algebra/linear_inequalities

Sequences and Patterns

Directions: In this task you are asked to examine and analyze the sequence represented in the diagram to the right.



1. Look at the shapes in the diagram to the right. How does the diagram change from the stage 1 to stage 2?

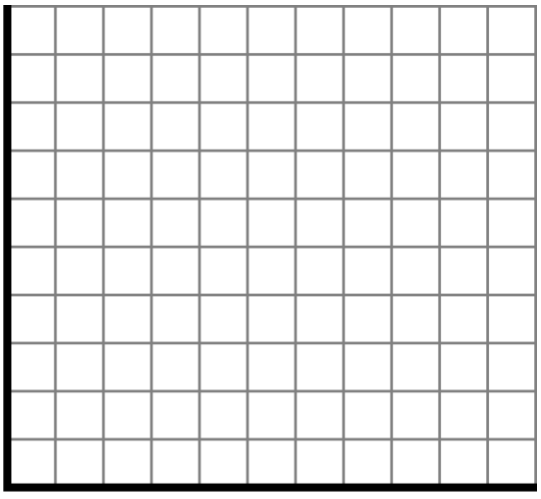
2. Describe anything that remains constant at all stages of the diagram

3. Using the diagram, complete the table of values.

Stage	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Number of Tiles									

4. Is this an Arithmetic Sequence, a geometric sequence, or neither? Justify your answer.

5. Graph the values from the table on the coordinate plane.



6. Write a functional rule to give the number of tiles at any (n) stage.