

BCMS Summer Mathematics Packet - ANSWER KEY

Decimal Operations

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

Task #1:

$$\begin{array}{c} \text{Smiley Face} + \text{Smiley Face} = 0.8 \\ \text{Star} + \text{Star} + \text{Star} = 10.2 \\ \text{Smiley Face} = \underline{0.4} \quad \text{Star} = \underline{3.4} \end{array}$$

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 \$7.52 Terry has \$9.38 Cheryl has \$4.73
Ben has \$3.62 Aaron has \$1.27

Need help?

<https://www.khanacademy.org/math/cc-seventh-grade-math/cc-7th-fractions-decimals>

BCMS Summer Mathematics Packet – ANSWER KEY

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

$$\frac{\boxed{8}}{\boxed{3}} \div \frac{\boxed{9}}{\boxed{4}} = 6 \qquad \frac{7}{\boxed{2}} \times \frac{\boxed{5}}{\boxed{7}} = \frac{5}{2}$$

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

Task #2

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

$$\frac{\boxed{0}}{\boxed{8}} + \frac{\boxed{6}}{\boxed{2}} = 3 \qquad \frac{\boxed{1}}{\boxed{5}} - \frac{\boxed{4}}{20} = 0 \qquad \frac{\boxed{7}}{\boxed{9}} + \frac{4}{18} = 1$$

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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: $[(11 + 3) - (2 \times 7)] / 5 = 0$

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: $(9 \div 9) \times (7 + 8 + 1) = 16$

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

Answers may vary.

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

Answers may vary.

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

Answers may vary.

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>

BCMS Summer Mathematics Packet - ANSWER KEY

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. $4^4(4^5) =$
 4^9

2. $(4^4)^5 =$
 4^{20}

3. $x^3y^7(x^4y^6) =$
 x^7y^{13}

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

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

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

9^{-6}

$9^{12}9^{-6}$

x^7y^2

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

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

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

9. $x^{\boxed{}}(x^{\boxed{}}) = x^{30}$

5

4

Answers vary. Ex: 10 and 20.

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

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

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

Answers vary. Ex: 6 and 8.

Answers vary. Ex: 3, 6, and 15

Answers vary. x: 3, 4, 2.

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

When $n < 2$. Ex: $(2^1)^1 = 2$ and $(2^1)(2^1) = 4$. $(2^2)^2 = 16$ and $(2^2)(2^2) = 16$. $(2^3)^3 = 512$ and $(2^3)(2^3) = 64$

Need help?

<https://www.khanacademy.org/math/algebra/exponent-equations/exponent-properties-algebra/v/exponent-properties-1>

BCMS Summer Mathematics Packet – ANSWER KEY

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.

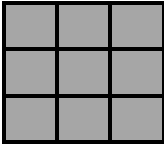
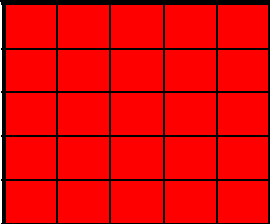
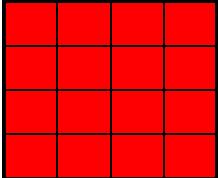
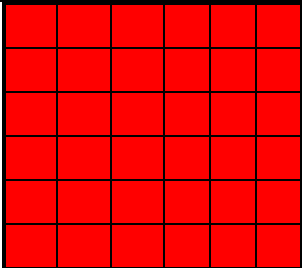
EXAMPLE: Doubled, my value is -12, but my product is the 36. What number am I? -6

1. Doubled, my value is 18, but my product is 81. What number am I? 9

2. Doubled, my value is 22, but my product is 121. What number am I? 11

3. Doubled, my value is 16, but my product is 64. What number am I? 8

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
	2×2	2^2	4
	3×3	3^2	9
	5×5	5^2	25
	4×4	4^2	16
	6×6	6^2	36

BCMS Summer Mathematics Packet – ANSWER KEY

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 if 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.

$$n < -4$$

If n is greater than -4 , the answer is not negative. For example $-7 + 4 = -3$ and $-5 + 4 = -1$.

2. $9 - n =$ a positive number.

$$n > 9$$

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

$$a < 0$$

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

$$n < 2$$

Need help?

<https://www.khanacademy.org/math/cc-seventh-grade-math/cc-7th-negative-numbers>

BCMS Summer Mathematics Packet – ANSWER KEY

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: $-10 \div 5 = -2$

Ex #4: $-10 \div -5 = 2$

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.

In order for $-4n$ to be a negative number, n must be positive. (etc.)

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

In order for $-4n$ to be a positive number, n must be negative. (etc.)

3. $100 \div n =$ some negative number between -20 and -1

$-100 < n < -5$ (etc.)

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

n must be an even number or zero. For example, 0, 2, 4, 6, and so forth.

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

Negative values.

Need help?

<https://www.khanacademy.org/math/cc-seventh-grade-math/cc-7th-negative-numbers>

[Solving Equations](#)

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

1. $-4h - 6 = 22$

$x = -7$

2. $\frac{m}{-5} + 6 = -4$

$m = 50$

3. $-25 = -4r + 5$

$r = 7.5$

4. $6 = -7 + \frac{x}{-3}$

$x = 39$

5. $5g - 3 = -12$

$g = -9/5$

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. $6y + 5 = 4y + 5$

Never

7. $5x + 8 = 8 + 5x$

Always

8. $7p - 8 = 7p + 6$

Never

9. $x^2 = 100$

Sometimes ($x = 10$ and $x = -10$)

10. $-2(6 - 10n) = 10(2n - 6)$

Never

11. $7(1 - y) = -3(y - 2)$

Sometimes ($y = \frac{1}{4}$)

Need Help?

<https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-solving-equations>

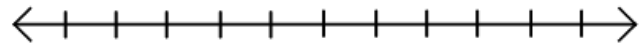
BCMS Summer Mathematics Packet - ANSWER KEY

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. $13 < 9 + 2x$

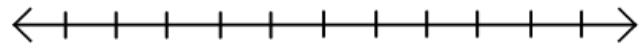
$x < 2$



open circle at $x = 2$, arrow to the left

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

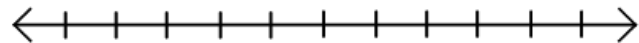
$x \leq 8.5$



closed circle at $x = 8.5$, arrow to the left

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

$x < -28$



open circle at $x = -28$, arrow to the left

Task #2:

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

No.

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

$x > 0$.

Need Help?

https://www.khanacademy.org/math/algebra/linear_inequalities