

Algebra 1 Summer Review

★ Objective A: I can write algebraic expressions.

<https://www.khanacademy.org/math/cc-sixth-grade-math/cc-6th-expressions-and-variables/cc-6th-writing-expressions/v/writing-expressions-2>

1A. 12 more than a number x

2A. 5 less than a number n

3A. 8 times a number n

4A. the quotient of a number n and 5

5A. 2 times the sum of a number n and 8

6A. 9 less than the product of a number x and 3

★ Objective B: I can write a word phrase for an algebraic expression.

<https://www.khanacademy.org/math/cc-fifth-grade-math/cc-5th-algebraic-thinking/cc-5th-writing-expressions-tut/v/translating-expressions-with-parentheses>

1B. $x + 2$

2B. $3(x + 4)$

3B. $\frac{n}{7}$

4B. $8n - 1$

★ **Objective C: I can use order of operations to simplify expressions.**

https://www.khanacademy.org/math/pre-algebra/order-of-operations/order_of_operations/v/introduction-to-order-of-operations

1C. $(5 - 2)^2 \div 3$

2C. $10 - 18 \div 6$

3C. $4 \bullet 7 - 6^2 \div 9$

4C. $\frac{1 + 2^3}{7 - 4}$

5C. $\left(\frac{2(5)}{8 - 6}\right)^3$

6C. $2[(8 + 3) - 3^2]$

7C. $2^5 - 4^2 \div 2^2$

8C. $(4(5))^3$

9C. $\left(\frac{27 - 12}{8 - 3}\right)^2$

10C. $\left(\frac{2}{3}\right)^2$

★ Objective D: I can evaluate algebraic expressions.

<https://www.khanacademy.org/math/algebra/introduction-to-algebra/variable-and-expressions/v/expressions-with-two-variables>

Evaluate each expression for $s = 4$ and $t = 2$

1D. $t + 6$

2D. $s^2 + t^2$

3D. $\frac{s^4}{4} - 10$

4D. $\left(\frac{2s}{-t^2}\right)^3$

Evaluate the following expressions for $x = 3$ and $y = -1$.

5D. $x^2 + x - 10 \div y^2$

6D. $2x - 7y$

7D. $(xy)^2 \div 3y$

8D. $-2x^2 + y^3$

★ **Objective E: I can simplify and estimate square roots.**

Estimate the following square roots with a calculator.

1E. $\sqrt{45}$

2E. $\sqrt{2}$

Estimate the following square roots without a calculator. Tell which two integers the square root falls between.

3E. $\sqrt{10}$

4E. $-\sqrt{39}$

5E. $\sqrt{84}$

6E. $-\sqrt{18}$

Simplify the following square roots.

7E. $\sqrt{64}$

8E. $\sqrt{\frac{1}{9}}$

9E. $\sqrt{\frac{81}{25}}$

10E. $\sqrt{36}$

★ **Objective F: I can classify and compare real numbers.**

<https://www.khanacademy.org/math/pre-algebra/fractions-pre-alg/number-sets-pre-alg/v/number-sets>

Rational Number – any number that you can write in the form $\frac{a}{b}$, where a and b are integers and $b \neq 0$. Can also be written as a terminating (ending) decimal or a repeating decimal.

Examples:

Other examples of rational numbers we can see on a number line:

Natural Numbers	$\{1, 2, 3, \dots\}$
Whole Numbers	$\{0, 1, 2, 3, \dots\}$
Integers	$\{\dots -2, -1, 0, 1, 2, 3, \dots\}$

Irrational Number – cannot be represented in the form $\frac{a}{b}$, in other words non-terminating (non-ending), non-repeating decimals

Examples: π , $\sqrt{2}$, $0.210922902390\dots$

To which subsets of the real numbers does each number belong? Circle ALL possible subsets.

1F. 15 irrational rational integer whole natural

2F. $\sqrt{9}$ irrational rational integer whole natural

3F. $\frac{3}{10}$ irrational rational integer whole natural

4F. -0.45 irrational rational integer whole natural

5F. $\sqrt{12}$ irrational rational integer whole natural

6F. π irrational rational integer whole natural

Put the following real numbers in order from least to greatest.

7F. $\sqrt{4}, 0.4, -\frac{2}{3}, \sqrt{2}, -1.5$

8F. $3.5, -2.1, \sqrt{9} - \frac{7}{2}, \sqrt{5}$

Compare the following real numbers using one of the following inequality symbols:

Inequality – a mathematical sentence that compares the values of two expressions using an inequality symbol.

<, less than , less than or equal to
>, greater than , greater than or equal to

9F. $\sqrt{17}$ _____ $4\frac{1}{3}$

10F. $\frac{4}{3}$ _____ $\sqrt{2}$

11F. -3.1 _____ $-\frac{16}{5}$

12F. $\frac{1}{3}$ _____ .333

★ Objective G: I can identify and use properties of real numbers.

Properties of Real Numbers

Let x, y and z be any real numbers.

Commutative Properties of Addition and Multiplication (Changing order does not change the sum or product)

	Algebra	Example
Addition	$x + y = y + x$	$10 + 4 = 4 + 10$
Multiplication	$xy = yx$	$23 = 32$

Associative Properties of Addition and Multiplication (Changing the grouping does not change the sum or product)

	Algebra	Example
Addition	$x + (y + z) = (x + y) + z$	$10 + (4 + 3) = (10 + 3) + 4$
Multiplication	$(xy)z = x(yz)$	$(23) 4 = 2(34)$

Let x be any real number.

Identity Properties of Addition and Multiplication

	Algebra	Example
Addition	$x + 0 = x$	$2 + 0 = 2$
Multiplication	$x \cdot 1 = x$	$9 \cdot 1 = 9$
Zero Property of Multiplication	$x \cdot 0 = 0$	$-4 \cdot 0 = 0$

Multiplication Property of -1	$-1 \cdot x = -x$	$-1 \cdot 5 = -5$
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Name the property illustrated by each statement.

1G. $42 \cdot 0 = 0$

2G. $(y + 2.5) + 28 = y + (2.5 + 28)$

3G. $10x + 0 = 10x$

4G. $4x \cdot 1 = 4x$

5G. $x \cdot y = y \cdot x$

6G. $-1 \cdot x = -x$

Write an equivalent expression using the indicated property.

7G. $x + (y + z) = \underline{\hspace{2cm}}$

Commutative Property

$x + (y + z) = \underline{\hspace{2cm}}$

Associative Property

8G. $5(3n) = \underline{\hspace{2cm}}$

Commutative Property

$5(3n) = \underline{\hspace{2cm}}$

Associative Property

★ Objective H: I can find sums and differences of real numbers.

https://www.khanacademy.org/math/arithmetic/absolute-value/adding_subtracting_negatives/v/adding-and-subtracting-negative-number-examples

https://www.khanacademy.org/math/arithmetic/absolute-value/adding_subtracting_negatives/v/adding-integers-with-different-signs

Simplify.

1H. $2 + 5$

2H. $-4 + 6$

3H. $-3 + 7$

4H. $-8 + (-5)$

5H. $2 - 7$

6H. $-12 - 6$

7H. $0 - 17$

8H. $-3 + 4$

9H. $5 - 10$

10H. $7 - (-4)$

11H. $-15 - (-1)$

12H. $0 - (-10)$

13H. $7 - (-3) - 2 - (-3) + 2$

14H. $2 - (-1) + 6 + (-11)$

15H. $-3 + 2 - (-4)$

16H. $4 + (-2) + 6 - (-5)$

17H. $14 - (-5) + 3 - 9$

18H. $(-5) + 4 + (-3)$

★ Objective I: I can find products and quotients of real numbers.

https://www.khanacademy.org/math/arithmetic/absolute-value/mult_div_negatives/v/multiplying-negative-real-numbers

1I. $(-4)(5)$

2I. $(-7)(-6)$

3I. $(3)(-8)$

4I. $-44 \div 4$

5I. $21 \div (-7)$

6I. $-49 \div (-7)$

7I. $(-1)(7)(-5)$

8I. $(1)(1)(-1)$

9I. $(-8)(0)(-1)$

10I. $(-2)^3$

11I. $-4 \div 2(-5) \div -1$

12I. $-6(-1)^5$

★ Objective J: I can find sums and differences of fractions.

<https://www.khanacademy.org/math/pre-algebra/fractions-pre-alg/fractions-unlike-denom-pre-alg/v/adding-and-subtracting-fractions>

<https://www.khanacademy.org/math/pre-algebra/fractions-pre-alg/fractions-unlike-denom-pre-alg/v/adding-fractions-ex-1>

1J. $\frac{2}{9} + \frac{5}{9}$

2J. $\frac{7}{9} - \frac{5}{9}$

3J. $\frac{3}{7} + \frac{2}{7}$

4J. $\frac{2}{3} + \frac{1}{6}$

5J. $\frac{3}{4} - \frac{1}{8}$

6J. $\frac{2}{5} - \frac{3}{10}$

7J. $-\frac{5}{6} + \frac{5}{12}$

8J. $\frac{2}{5} + \frac{1}{3}$

9J. $\frac{1}{4} - \frac{3}{7}$

★ Objective K: I can find products and quotients of fractions.

https://www.khanacademy.org/math/arithmetic/fractions/multiplying_fractions/v/multiplying-negative-and-positive-fractions

<https://www.khanacademy.org/math/arithmetic/fractions/div-fractions-fractions/v/dividing-fractions-example>

1K. $\left(\frac{1}{2}\right)\left(\frac{3}{4}\right)$

2K. $\left(-\frac{1}{3}\right)\left(\frac{2}{5}\right)$

3K. $(4)\left(-\frac{2}{7}\right)$

4K. $(2)\left(-\frac{1}{4}\right)$

5K. $\left(\frac{1}{2}\right) \div \left(\frac{3}{7}\right)$

6K. $\left(-\frac{3}{4}\right) \div 8$

7K. $\frac{2}{3} \div \frac{1}{4}$

8K. $5 \div -\frac{3}{8}$

9K. $\left(-\frac{6}{7}\right)\left(-\frac{2}{5}\right)$

Evaluate each expression for $m = -5$, $n = \frac{3}{2}$, $p = -8$.

10K. $-7m - 10n$

11K. $-3mnp$

12K. $8n \div (-6p)$

13K. $2p^2(-n) \div m$

★ Objective L: I can use the distributive property to simplify expressions.

https://www.khanacademy.org/math/pre-algebra/order-of-operations/distributive_property/v/distributive-property-example-1

1L. $3(x + 8)$

2L. $-7(5b - 4)$

3L. $5(x + 7)$

4L. $12\left(3 - \frac{1}{6}x\right)$

5L. $(4x + 8)(3)$

6L. $(2y - 1)(-4)$

7L. $-(2y - 3x)$

8L. $-(a - 5)$

9L. $\frac{3}{4}(20x - 8)$