



Nashua
Community
College

Online tutoring for MATH 090N/099N students
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WHAT IS KHAN ACADEMY? www.khanacademy.org

Khan Academy is a free, online, educational community which offers lessons, videos, and so much more in a variety of subjects. Many students use Khan Academy as a supplemental resource to learn and reinforce their math skills. Students are recommended to watch videos that correlate to topics of interest and to then complete exercise sets on these same topics. Videos can be watched as many times as you like and exercise sets can be practiced until you feel comfortable with the material.

USING KHAN ACADEMY

To start learning and find what you're looking for, check the playlist below and then search for things in the **search bar** of Khan Academy. When you search for something, you will notice that it could reference a Video (represented by ▶ on the playlist) or a Skill (represented by ☆ on the playlist). So if you're looking to learn how to add and subtract negative numbers, you can search for the video "Adding numbers with different signs (example)" (which is 5 minutes and 33 seconds long); make sure when you find it that it brings you to a video. If you then want to practice exercises relating to this topic, you can then search for "Adding negative numbers intro" which is an exercise set with 3-5 problems in it.

"What to Search" is what you type in the search bar. What you are looking for is written exactly as shown here and is case-sensitive; remember that a ▶ symbol means "Video" and a ☆ symbol means "Skill".

Topics	What to Search
<p>-Operations on Integers (+ - ÷ ×)</p> <p>$5 + -7$ $-6 - 3$</p> <p>$-4 \div 2$ 9×-8</p> <p>-Basic Exponent Rules</p> <p>4^3 1^0 $(-2)^2$</p> <p>-Order of Operations</p> <p>$3 + 6(7)$ $-8 \div 4 - 2^2$</p> <p>-Evaluating Variable Expressions</p> <p>Evaluate $5a^2 - b^3$ if $a = -3$ and $b = 1$</p>	<ul style="list-style-type: none"> ▶ Adding and subtracting negative numbers (4:06) ▶ Adding numbers with different signs (example) (5:33) ★ Adding negative numbers intro ★ Subtracting negative numbers intro ▶ Multiplying positive and negative numbers (5:33) ▶ Dividing positive and negative numbers (4:51) ★ Multiplying and dividing negative numbers ▶ Introduction to exponents (3:02) ▶ Raising a number to the 0 and 1st power (5:06) ★ Whole number exponents with integer bases ★ Exponents ▶ Introduction to order of operations (9:39) ▶ Order of operations example (4:26) ★ Order of operations ★ Order of operations with negative numbers ▶ Example: Evaluating expressions with 2 variables (1:29) ★ Evaluating expressions with two variables
<p>-Converting Mixed Numbers and Improper Fractions</p> <p>$9\frac{3}{4} = \frac{39}{4}$</p> <p>-Simplifying Fractions</p> <p>$\frac{8}{12} = \frac{2}{3}$</p> <p>-Operations on Fractions (+ - ÷ ×)</p> <p>$\frac{7}{10} \cdot \frac{2}{14}$ $-6 \div \frac{1}{6}$</p> <p>$\frac{2}{5} + \frac{3}{15}$ $\frac{4}{21} + (-\frac{8}{21})$</p>	<ul style="list-style-type: none"> ▶ Mixed numbers: changing to improper fractions (6:42) ▶ Mixed numbers: changing from an improper fraction (4:01) ★ Converting mixed numbers and improper fractions ▶ Fractions in lowest terms (5:41) ★ Simplifying fractions ▶ Multiplying two fractions: example (2:25) ▶ Multiplying negative and positive fractions (4:32) ★ Multiplying positive and negative fractions ▶ Dividing fractions example (1:16) ▶ Dividing negative fractions (4:10) ★ Dividing positive and negative fractions ▶ Adding fractions with like denominators (3:17) ▶ Subtracting fractions with like denominators (2:25) ★ Subtracting fractions with common denominators ▶ How to add fractions that have different denominators (4:06) ▶ Example of subtracting fractions with unlike denominators (4:24)

<p>-Operations on Mixed Numbers</p> $2\frac{3}{4} \cdot 1\frac{1}{4} \qquad -4\frac{6}{11} + 7\frac{3}{22}$	<ul style="list-style-type: none"> ★ Adding and subtracting negative fractions ▶ How to multiply mixed numbers (4:21) ★ Multiplying mixed numbers ▶ Adding mixed numbers with like denominators (1:34) ▶ Subtracting mixed numbers with like denominators (2:30) ★ Adding and subtracting mixed numbers with like denominators 1
<p>-Decimal Place Value and Rounding</p> <p>7.081 rounded to the nearest hundredth is 7.08</p> <p>-Converting from Fractions to Decimals to Percents and vice versa</p> $0.5 = \frac{1}{2} = 50\%$ $0.75 = \frac{3}{4} = 75\%$ <p>-Operations on Decimals (+ - ÷ ×)</p> $0.352 - 0.406 \qquad 1.22 + 29.3$ $35.6 \times 60.2 \qquad 60 \div 10.65$	<ul style="list-style-type: none"> ▶ Decimal place value (3:59) ★ Rounding decimals ▶ Converting decimals to fractions example 3 (1:13) ★ Rewriting decimals as fractions ▶ Converting decimals to percents (2:35) ★ Converting decimals to percents ▶ Converting percents to decimals (1:22) ★ Converting percents to decimals ▶ Converting percent to decimal and fraction (3:31) ▶ Fraction to decimal example (1:32) ★ Converting fractions to decimals ▶ Adding decimals: example 1 (2:40) ▶ Subtracting decimals example 1 (2:08) ★ Adding decimals 1 ★ Subtracting decimals 2 ▶ Multiplying challenging decimals (4:24) ★ Multiplying decimals 2 ▶ Dividing completely to get decimal answer example 2 (2:21) ▶ Dividing by a multi-digit decimal (5:31) ★ Dividing decimals 3
<p>-Combining Like Terms</p> $2x + (-3x) \qquad -5ab + 9ab$	<ul style="list-style-type: none"> ▶ Combining like terms introduction (4:32) ▶ How to simplify a big expression by combining like terms (3:42) ▶ Combining like terms, but more complicated (4:38) ★ Combining like terms with negative coefficients

<p>-Distributive Property</p> $8(x + 5) \quad 6 - 3(2x + 1)$ <p>-Adding & Subtracting Polynomials</p> $(x^2+3x-5) - (6x^2+7x-2)$ <p>-Exponent Properties</p> $5^{-2} \quad (3x^3)^4$ $y^7 \cdot y^9 \quad \frac{2a^6b^5}{4a^2b^7}$	<ul style="list-style-type: none"> ▶ The distributive law of multiplication over addition (4:55) ▶ How to simplify an expression by combining like terms and the distributive property (4:06) ★ Combining like terms with distribution and negative numbers ▶ Example 2: Adding polynomials (2:00) ▶ Adding and subtracting polynomials (1:44) ▶ Example 4: Adding and subtracting polynomials (2:26) ★ Adding and subtracting polynomials with one variable ▶ Exponent properties involving products (14:00) ▶ Exponent properties involving quotients (examples) (9:22) ▶ Negative exponents (7:13) ★ Positive and negative exponents ▶ Exponent properties 1 (2:35) ▶ Exponent properties 2 (5:11) ▶ Exponent properties 3 (2:34) ▶ Exponent properties 4 (3:06) ★ Simplifying rational expressions with exponent properties
<p>-FOIL (Multiplying two Binomials)</p> $(x + 9)(x - 3) \quad (y - 1)(y + 5)$ <p>-Multiplying Polynomials</p> $(x + 2)(x^2 - 4x + 3)$ <p>-Solving One-step and Two-step Equations</p> $4x = 12 \quad 7 = \frac{y}{6}$ $y + 1 = 9 \quad 4 = x - 5$ $2y + 1 = 5 \quad 9 - 3x = -9$	<ul style="list-style-type: none"> ▶ Multiplying binomials and polynomials (9:49) ▶ Example 1: Multiplying a binomial by a binomial (5:47) ★ Multiplying binomials by binomials ★ Finding special products of binomials (basic) ▶ Example 3: Multiplying a monomial by a polynomial (2:42) ▶ Multiplying polynomials example (5:45) ★ Multiplying binomials by polynomials ▶ Simple equations: examples solving a variety of forms (12:29) ▶ How to solve equations of the form $ax = b$ (11:05) ▶ How to solve equations of the form $x/a = b$ (2:22) ★ One-step equations with addition and subtraction ★ One-step equations with multiplication and division ▶ Solving a more complicated equation (8:40) ▶ Example: two-step equation with numerator x (3:03) ★ Two-step equations

<p>-Equations with Variables on Both Sides</p> $7x + 4 = 3x - 8$ <p>-Ratios and Proportions</p> $\frac{x}{6} = \frac{10}{11}$	<ul style="list-style-type: none"> ▶ How to solve an equation with variables on both sides (20 - 7y = 6y - 6) (4:32) ▶ How to solve an equation with variables on both sides (example) (4:06) ★ Equations with variables on both sides ▶ Solving a proportion with an unknown variable (example) (7:19) ★ Solving proportions
<p>-Functions</p> <p>$f(x) = 4x - 1$, find $f(2)$</p> <p>-Ordered Pair Solutions</p> <p>Is $(1, 2)$ a solution to $x + 3y = -7$</p>	<ul style="list-style-type: none"> ▶ Determining a linear equation by checking solutions (3:35) ★ Checking solutions to two-variable linear equations ▶ How to evaluate a function given its formula (example) (0:58) ★ Evaluating functions ▶ Ordered pair solutions to equations (1:28) ★ Ordered pair solutions to linear equations
<p>-The Coordinate Plane</p> <p>$(-6, 0)$ $(3, 1)$ $(2, 8)$</p> <p>-Slope of a Line</p> <p>$y = mx + b$</p> <p>-Graphing Linear Equations</p> <p>Graph $y = 4x + 2$</p> <p>-Graphing Linear Inequalities</p> <p>Graph $y \leq x + 1$</p>	<ul style="list-style-type: none"> ▶ Coordinate plane examples (6:49) ★ Points on the coordinate plane ▶ Finding the slope of a line from its graph (4:39) ▶ Slope from two ordered pairs example 1 (7:11) ▶ Slope from two ordered pairs example 2 (5:04) ★ Identifying slope of a line ▶ Graph from slope-intercept equation example (3:01) ▶ Converting linear equations to slope-intercept form (5:06) ★ Graphing linear equations ▶ Introduction to graphing inequalities (8:03) ▶ Graphing inequalities 2 (5:19) ★ Completing solutions of two-variable linear inequalities

-Greatest Common Factor and Basic Factoring

$$7x - 49 \rightarrow 7(x - 7)$$

-Factoring Quadratic Trinomials

$$x^2 - 7x + 10 \rightarrow (x - 5)(x - 2)$$

$$2x^2 + 12x + 16 \rightarrow 2(x + 2)(x + 4)$$

-Solving a Quadratic Equation by Factoring

$$x^2 - x - 12 \rightarrow (x - 4)(x + 3)$$

$$\text{So } x = 4 \text{ or } x = -3$$

-Difference of Squares

$$x^2 - 64 \rightarrow (x - 8)(x + 8)$$

$$4x^2 - 25 \rightarrow (2x - 5)(2x + 5)$$

-Factoring Quadratic Trinomials where the Leading Coefficient is greater than 1

$$3x^2 - 14x - 5 \rightarrow (3x + 1)(x - 5)$$

- ▶ [Example 3: Factor a quartic binomial with two variables by taking a common factor \(5:28\)](#)
- ▶ [Example 2: Factor a quadratic binomial with two variables by taking a common factor \(4:46\)](#)
- ▶ [Example 4: Factor a polynomial with two variables by taking a common factor \(5:53\)](#)
- ★ [Factoring algebraic expressions using the distributive property](#)

- ▶ [More examples of factoring quadratics with a leading coefficient of 1 \(16:30\)](#)
- ★ [Factoring quadratics with a leading coefficient of 1](#)
- ▶ [Example 1: Factoring trinomials with a common factor \(5:01\)](#)
- ★ [Factoring polynomials using quadratic methods](#)

- ▶ [Solving a quadratic equation by factoring \(6:22\)](#)
- ★ [Solving quadratics by factoring](#)

- ▶ [Example 1: Factoring a difference of squares with two variables \(1:49\)](#)
- ★ [Factoring simple special products](#)
- ★ [Factoring differences of squares](#)

- ▶ [Example 2: Factoring quadratics by grouping \(3:54\)](#)
- ▶ [Example 3: Factoring quadratics by taking a common factor and grouping \(4:46\)](#)
- ▶ [Example 4: Factoring quadratics by taking a negative common factor and grouping \(5:17\)](#)
- ★ [Factoring quadratics with a leading coefficient other than 1](#)

Sample Exam for Algebra MATH 099

1. **Simplify:** $5 + 4 \times 3^2$

2. **Simplify:** $-8 \div (4 - 2) + 7$

3. **Simplify:** $-17 - 2^3 + 5(5)$

4. **Simplify:** $\frac{6 + 6 \div (-3)}{(-4)^2 - 3(4)}$

5. **Evaluate:** $\frac{a^2 - b + 3}{b^3 + 9}$ if $a = -2$ and $b = -1$

6. **Add:** $-\frac{3}{16} + \frac{1}{4}$

7. **Subtract:** $-\frac{3}{5} - \frac{1}{3}$

8. **Subtract:** $1\frac{1}{2} - 2\frac{1}{5}$

9. **Multiply:** $2\frac{1}{3} \cdot 1\frac{1}{14}$

10. **Divide:** $3\frac{3}{5} \div 9$

11. **Divide:** $-10 \div 4\frac{3}{8}$

12. **Convert to a Percent and a Fraction:** 0.781

13. **Simplify:** $x^2 + 3y - 5x^2 - 2y$

14. **Simplify:** $6ab + 8a - 7b + 3a$

15. **Simplify:** $3(6x - 2) - 9(x + 1)$

16. **Simplify:** $4 - 7(2y + 3)$

17. **Simplify:** $(x^2 - 3x + 1) - (x^2 + 9x - 3)$

18. **Simplify:** $\frac{2a^3b^6}{4ab^8}$

19. **Simplify:** $\left(\frac{2x^5}{y}\right)^3$

20. **Multiply:** $(x - 9)(x + 5)$

21. **Multiply:** $(x + 2)(x^2 - 4x + 3)$

22. **Solve:** $7 = 3 - 4x$

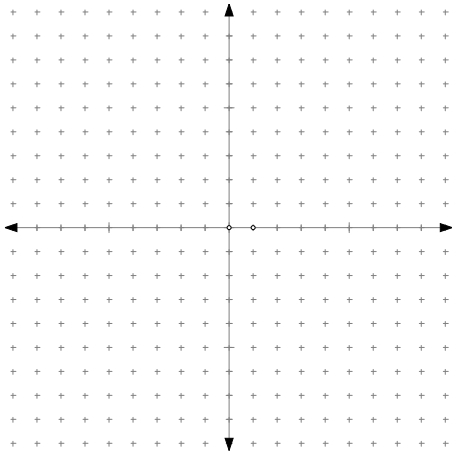
23. **Solve:** $5(3x - 1) + 2 = 6$

24. **Solve:** $7x + 4 = 3x - 8$

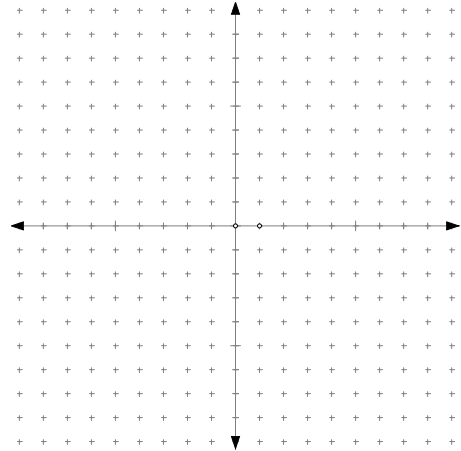
25. **Solve:** $5(x + 4) = 4x - 5 + 2x$

26. **Is $(-1, 9)$ a solution to:** $y = -5x + 4$

27. **Graph:** $y - 6 = -3x$



28. **Graph:** $y < 2x - 4$



29. **Factor:** $x^2 - 9x + 18$

30. **Factor:** $16x^2 - 49$

31. **Factor:** $3x^2 + 6x - 9$

32. **Factor:** $3x^2 - 14x - 5$

33. **Solve:** $x^2 + 5x + 6 = 0$

34. **Solve:** $x^2 - 11x = -28$