Prepare for the ALEKS Math Test in 7 Days

2019

A Quick Study Guide with Two Full-Length ALEKS Math Practice Tests

Reza Nazari & Ava Ross

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By

Reza Nazari & Ava Ross

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Description

Prepare for the ALEKS Math Test in 7 Days, which reflects the 2019 and 2020 test guidelines and topics, incorporates the best method and the right strategies to help you hone your math skills, overcome your exam anxiety, and boost your confidence -- and do your best to defeat ALEKS Math test quickly. This quick study guide contains only the most important and critical math concepts a student will need in order to succeed on the ALEKS Math test. Math concepts in this book break down the topics, so the material can be quickly grasped. Examples are worked step–by–step to help you learn exactly what to do.

This ALEKS Math new edition has been updated to duplicate questions appearing on the most recent ALEKS Math tests. It contains easy–to–read essential summaries that highlight the key areas of the ALEKS Math test. You only need to spend about 3 – 5 hours daily in your 7–day period in order to achieve your goal. After reviewing this book, you will have solid foundation and adequate practice that is necessary to fully prepare for the ALEKS Math.

Prepare for the ALEKS Math Test in 7 Days is for all ALEKS Math test takers. It is a breakthrough in Math learning — offering a winning formula and the most powerful methods for learning basic Math topics confidently. Each section offers step–by–step instruction and helpful hints, with a few topics being tackled each day.

Inside the pages of this comprehensive book, students can learn math topics in a structured manner with a complete study program to help them understand essential math skills. It also has many exciting features, including:

- Content 100% aligned with the 2019-2020 ALEKS test
- Written by ALEKS Math tutors and test experts
- Complete coverage of all ALEKS Math concepts and topics which you will be tested
- Step-by-step guide for all ALEKS Math topics
- Dynamic design and easy-to-follow activities
- Over 1,500 additional ALEKS math practice questions in both multiple-choice and grid-in formats with answers grouped by topic, so you can focus on your weak areas
- 2 full-length practice tests (featuring new question types) with detailed answers

Effortlessly and confidently follow the step–by–step instructions in this book to prepare for the ALEKS Math in a short period of time.

Prepare for the ALEKS Math Test in 7 Days is the only book you'll ever need to master Basic Math topics! It can be used as a self–study course – you do not need to work with a Math tutor. (It can also be used with a Math tutor).

Ideal for self–study as well as for classroom usage.

About the Author

Reza Nazari is the author of more than 100 Math learning books including:
– Math and Critical Thinking Challenges: For the Middle and High School Student
– GRE Math in 30 Days
– ASVAB Math Workbook 2018 - 2019
– Effortless Math Education Workbooks
– and many more Mathematics books …

Reza is also an experienced Math instructor and a test–prep expert who has been tutoring students since 2008. Reza is the founder of Effortless Math Education, a tutoring company that has helped many students raise their standardized test scores—and attend the colleges of their dreams. Reza provides an individualized custom learning plan and the personalized attention that makes a difference in how students view math.

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Contents

Day 1: Integers, Ratios, and Proportions 9
Adding and Subtracting Integers 10
Multiplying and Dividing Integers 10
Order of Operations 11
Integers and Absolute Value 12
Simplifying Ratios 12
Proportional Ratios 13
Similarity and Ratios 13
Day 1 Practices 15
Answers 17
Day 2: Percentage, Exponents, Variables and Roots 18
Percentage Calculations 19
Percent Problems 19
Percent of Increase and Decrease 20
Simple Interest 20
Multiplication Property of Exponents 21
Division Property of Exponents 21
Powers of Products and Quotients 22
Zero and Negative Exponents 23
Negative Exponents and Negative Bases 23
Scientific Notation 24
Square Roots 25
Day 2 Practices 26
Answers 28
Day 3: Expressions, Variables, Equations and Inequalities 29
Simplifying Variable Expressions 30
Simplifying Polynomial Expressions 30
The Distributive Property 31
Evaluating One Variable 31
Evaluating Two Variables 32
Combining like Terms 32

One–Step Equations 33
Multi–Step Equations 33
Graphing Single–Variable Inequalities 34
One–Step Inequalities 34
Multi–Step Inequalities 35
Day 3 Practices 36
Answers 38
Day 4: Linear Equations and Inequalities 39
Finding Slope 40
Graphing Lines Using Slope–Intercept Form 40
Graphing Lines Using Standard Form 41
Writing Linear Equations 41
Graphing Linear Inequalities 42
Finding Midpoint 43
Finding Distance of Two Points 43
Day 4 Practices 45
Answers 47
Day 5: Monomials and Polynomials 49
Simplifying Polynomials 50
Adding and Subtracting Polynomials 50
Multiplying Monomials 51
Multiplying and Dividing Monomials 51
Multiplying a Polynomial and a Monomial 52
Multiplying Binomials 52
Factoring Trinomials 53
Operations with Polynomials 54
Day 5 Practices 55
Answers 57
Day 6: Geometry and Statistics 58
The Pythagorean Theorem 59
Triangles 59
Polygons 60

Percentage Calculations

Step-by-step guide:

- ✓ Percent is a ratio of a number and 100. It always has the same denominator, 100. Percent symbol is %.
- ✓ Percent is another way to write decimals or fractions. For example:

$$40\% = 0.40 = \frac{40}{100} = \frac{2}{5}$$

- ✓ Use the following formula to find part, whole, or percent:

$$\text{part} = \frac{\text{percent}}{100} \times \text{whole}$$

Examples:

1) What is 10% of 45? Use the following formula: $\text{part} = \frac{\text{percent}}{100} \times \text{whole}$

$$\text{part} = \frac{10}{100} \times 45 \rightarrow \text{part} = \frac{1}{10} \times 45 \rightarrow \text{part} = \frac{45}{10} \rightarrow \text{part} = 4.5$$

2) What is 15% of 24? Use the percent formula: $\text{part} = \frac{\text{percent}}{100} \times \text{whole}$

$$\text{part} = \frac{15}{100} \times 24 \rightarrow \text{part} = \frac{360}{100} \rightarrow \text{part} = 3.6$$

Percent Problems

Step-by-step guide:

- ✓ In each percent problem, we are looking for the base, or part or the percent.
- ✓ Use the following equations to find each missing section.
  - Base = Part ÷ Percent
  - Part = Percent × Base
  - Percent = Part ÷ Base

Examples:

1) 1.2 is what percent of 24?

In this problem, we are looking for the percent. Use the following equation:

$$Percent = Par \div Base \rightarrow Percent = 1.2 \div 24 = 0.05 = 5\%$$

2) 20 is 5% of what number?

Use the following formula: $Base = Part \div Percent \rightarrow Base = 20 \div 0.05 = 400$
20 is 5% of 400.

Percent of Increase and Decrease

Step-by-step guide:

To find the percentage of increase or decrease:

- ✓ New Number – Original Number
- ✓ The result ÷ Original Number × 100
- ✓ If your answer is a negative number, then this is a percentage decrease. If it is positive, then this is a percent of increase.

Examples:

1) Increased by 50%, the numbers 84 becomes:

   First find 50% of 84 $\rightarrow$ $\frac{50}{100} \times 84 = \frac{50 \times 84}{100} = 42$

   Then: $84 + 42 = 126$

2) The price of a shirt increases from $\$10$ to $\$14$. What is the percent increase?
   First: $14 - 10 = 4$
   4 is the result. Then: $4 \div 10 = \frac{4}{10} = 0.4 = 40\%$

Simple Interest

Step-by-step guide:

- ✓ Simple Interest: The charge for borrowing money or the return for lending it.
  To solve a simple interest problem, use this formula:
  Interest = principal x rate x time $\Rightarrow$ $\boldsymbol{I = p \times r \times t}$

Examples:

1) Find simple interest for $\$450$ investment at 7% for 8 years.
   Use Interest formula: $I = prt$, $P = \$450$, $\mathrm{r} = 7\% = \frac{7}{100} = 0.07$ and $t = 8$
   Then: $I = 450 \times 0.07 \times 8 = \$252$

2) Find simple interest for $\$5{,}200$ at 4% for 3 years.

Use Interest formula: $I = prt$, $P = \$5{,}200$, r $= 4\% = \frac{4}{100} = 0.04$ and $t = 3$
Then: $I = 5{,}200 \times 0.04 \times 3 = \$624$

Multiplication Property of Exponents

Step-by-step guide:

- ✓ Exponents are shorthand for repeated multiplication of the same number by itself. For example, instead of 2×2, we can write 2^2. For $3 \times 3 \times 3 \times 3$, we can write 3^4
- ✓ In algebra, a variable is a letter used to stand for a number. The most common letters are: $x, y, z, a, b, c, m, and\ n.$
- ✓ Exponent's rules: $x^a \times x^b = x^{a+b}$, $\frac{x^a}{x^b} = x^{a-b}$

$$(x^a)^b = x^{a\times b}, \qquad (xy)^a = x^a \times y^a \text{ , } (\frac{a}{b})^c = \frac{a^c}{b^c}$$

Examples:

1) Multiply. $-2x^5 \times 7x^3 =$
Use Exponent's rules: $x^a \times x^b = x^{a+b} \rightarrow x^5 \times x^3 = x^{5+3} = x^8$
Then: $-2x^5 \times 7x^3 = -14x^8$

2) Multiply. $(x^2y^4)^3 =$
Use Exponent's rules: $(x^a)^b = x^{a\times b}$. Then: $(x^2\ y^4)^3 = x^{2\times3}y^{4\times3} = x^6y^{12}$

Division Property of Exponents

Step-by-step guide:

- ✓ For division of exponents use these formulas: $\frac{x^a}{x^b} = x^{\text{a−b}}$, $x \neq 0$

$$\frac{x^a}{x^b} = \frac{1}{x^{b-a}}\text{ , } x \neq 0, \qquad \frac{1}{x^b} = x^{-b}$$

Examples:

1) Simplify. $\frac{4x^3y}{36x^2y^3} =$

First cancel the common factor: $4 \rightarrow \frac{4x^3y}{36x^2y^3} = \frac{x^3y}{9x^2y^3}$

Use Exponent's rules: $\frac{x^a}{x^b} = x^{a-b} \rightarrow \frac{x^3}{x^2} = x^{3-2}$

Then: $\frac{4x^3y}{36x^2y^3} = \frac{xy}{9y^3}$ → now cancel the common factor: $y \rightarrow \frac{xy}{9y^3} = \frac{x}{9y^2}$

2) Divide. $\frac{2x^{-5}}{9x^{-2}} =$

Use Exponent's rules: $\frac{x^a}{x^b} = \frac{1}{x^{b-a}} \rightarrow \frac{x^{-5}}{x^{-2}} = \frac{1}{x^{-2-(-5)}} = \frac{1}{x^{-2+5}} = \frac{1}{x^3}$

Then: $\frac{2x^{-5}}{9x^{-2}} = \frac{2}{9x^3}$

Powers of Products and Quotients

Step-by-step guide:

- ✓ For any nonzero numbers a and b and any integer x, $(ab)^x = a^x \times b^x$.

Examples:

1) Simplify. $(3x^5y^4)^2 =$

Use Exponent's rules: $(x^a)^b = x^{a \times b}$

$(3x^5y^4)^2 = (3)^2(x^5)^2(y^4)^2 = 9x^{5\times2}y^{4\times2} = 9x^{10}y^8$

2) Simplify. $(\frac{2x}{3x^2})^2 =$ First cancel the common factor: $x \rightarrow (\frac{2x}{3x^2})^2 = (\frac{2}{3x})^2$

Use Exponent's rules: $(\frac{a}{b})^c = \frac{a^c}{b^c}$, Then: $(\frac{2}{3x})^2 = \frac{2^2}{(3x)^2} = \frac{4}{9x^2}$

Zero and Negative Exponents

Step-by-step guide:

- ✓ A negative exponent simply means that the base is on the wrong side of the fraction line, so you need to flip the base to the other side. For instance, "x^{-2}" (pronounced as "ecks to the minus two") just means "x^2" but underneath, as in $\frac{1}{x^2}$.

Examples:

1) Evaluate. $(\frac{4}{9})^{-2} =$

Use Exponent's rules: $\frac{1}{x^b} = x^{-b} \rightarrow (\frac{4}{9})^{-2} = \frac{1}{(\frac{4}{9})^2} = \frac{1}{\frac{4^2}{9^2}}$

Now use fraction rule: $\frac{1}{\frac{b}{c}} = \frac{c}{b} \rightarrow \frac{1}{\frac{4^2}{9^2}} = \frac{9^2}{4^2} = \frac{81}{16}$

2) Evaluate. $(\frac{5}{6})^{-3} =$

Use Exponent's rules: $\frac{1}{x^b} = x^{-b} \rightarrow (\frac{5}{6})^{-3} = \frac{1}{(\frac{5}{6})^3} = \frac{1}{\frac{5^3}{6^3}}$

Now use fraction rule: $\frac{1}{\frac{b}{c}} = \frac{c}{b} \rightarrow \frac{1}{\frac{5^3}{6^3}} = \frac{6^3}{5^3} = \frac{216}{125}$

Negative Exponents and Negative Bases

Step-by-step guide:

- ✓ Make the power positive. A negative exponent is the reciprocal of that number with a positive exponent.
- ✓ The parenthesis is important!
- ✓ 5^{-2} is not the same as $(-5)^{-2}$

$$(-5)^{-2} = -\frac{1}{5^2} \text{ and } (-5)^{-2} = +\frac{1}{5^2}$$

Examples:

1) Simplify. $(\frac{3a}{2c})^{-2} =$

Use Exponent's rules: $\frac{1}{x^b} = x^{-b} \rightarrow (\frac{3a}{2c})^{-2} = \frac{1}{(\frac{3a}{2c})^2} = \frac{1}{\frac{3^2a^2}{2^2c^2}}$

Now use fraction rule: $\frac{1}{\frac{b}{c}} = \frac{c}{b} \rightarrow \frac{1}{\frac{3^2a^2}{2^2c^2}} = \frac{2^2c^2}{3^2a^2}$

Then: $\frac{2^2c^2}{3^2a^2} = \frac{4c^2}{9a^2}$

2) Simplify. $(-\frac{5x}{3yz})^{-3} =$

Use Exponent's rules: $\frac{1}{x^b} = x^{-b} \rightarrow (-\frac{5x}{3yz})^{-3} = \frac{1}{(-\frac{5x}{3yz})^3} = \frac{1}{-\frac{5^3x^3}{3^3y^3z^3}}$

Now use fraction rule: $\frac{1}{\frac{b}{c}} = \frac{c}{b} \rightarrow \frac{1}{\frac{5^3x^3}{3^3y^3z^3}} = -\frac{3^3y^3z^3}{5^3x^3} = -\frac{27y^3z^3}{125x^3}$

Scientific Notation

Step-by-step guide:

- ✓ It is used to write very big or very small numbers in decimal form.
- ✓ In scientific notation all numbers are written in the form of:

$$m \times 10^n$$

Decimal notation	Scientific notation
5	5×10^0
$-25{,}000$	-2.5×10^4
0.5	5×10^{-1}
$2{,}122.456$	2.122456×10^3

Examples:

1) Write $\mathbf{0.0001}$ in scientific notation.

First, move the decimal point to the right so that you have a number that is between 1 and 10. Then: $N = 1.2$

Second, determine how many places the decimal moved in step 1 by the power of 10.

Then: 10^{-4} → When the decimal moved to the right, the exponent is negative.

Then: $0.00012 = 1.2 \times 10^{-4}$

2) Write $\mathbf{8.3 \times 10^{-5}}$ in standard notation.

10^{-5} → When the decimal moved to the right, the exponent is negative.

Then: $8.3 \times 10^{-5} = 0.000083$