Links *to Instructional Movies* that Help Students Review
99 Key Math Concepts for College Readiness Testing

Part III: Number & Operations

Number Properties

45	Undefined	*Can you divide by zero?*
46	Real/Imaginary [Why We Need Integers](#)	*What numbers can be represented on the number line?* *What numbers cannot be represented on the number line?*
47	Integer/Non-integer	*Draw a number line from +5 to -5 and represent all the integers.*
48	Rational/Irrational [Irrational Numbers on the Computer](#)	*Circle all the rational numbers. Draw a line under all the irrational numbers.* *√1, √2, √3, √4, √5, √6, √7, √8, √9, √10, ½, .3, .3, π, ¾, 5/1001, .0007*
49	Adding/Subtracting Signed Numbers *addition* [Adding Integers](#) [Four Ways to Teach Addition](#) s*ubtraction* [Using Two-Color Chips](#) [Subtracting Integers: Adding the Opposite](#)	*-4 + -5* *-4 – - 5*

50	Multiplying/Dividing Signed Numbers [Rules for Multiplication & Division](#) [Proving Multiplication Rule: Pattern](#) [Proving Multiplication Rule: Chips](#)	*-2(-5)* *+10/-2*
51	Order of Operations [Order of Operations](#)	*4 + 2^2 ×10 + 4 − 6(2)*
52	Absolute Value [Absolute Value: Intro](#)	*-2 + 1 − [4 + 5]*
53	Counting Consecutive Integers [Intro to Consecutive Numbers](#) [Identifying Consecutive #s Using a Shortcut](#) [Identifying Two Consecutive #s Using Guess & Check](#) [Identifying Two Consecutive #s Using Division](#) [Identifying Two Consecutive #s Using Equations](#) [Identifying Three Consecutive #s](#) [Identifying Four Consecutive #s](#)	*Count the consecutive integers from 10 through 21.*

Divisibility

54	Factor/Multiple *factors* [Finding Factors of 126](#) [Solving Rectangle Riddles with Factors](#) [Table of Factors](#) *multiples* [Multiples](#)	*Find all the factors of 12.* *Give the first five multiples of 12.*

55	Prime Factorization Prime Number Definition Prime Factorization Prime Factorization: 2 thru 15	*Give the prime factorization of 24.*
56	Relative Primes	*Explain why 54 and 25 are relative primes.*
57	Common Multiple Venn Diagram	*Give five common multiples for 2 and 3.*
58	Least Common Multiple (LCM) GCF & LCM Games	*Find the least common multiple (LCM) for 2 and 5.*
59	Greatest Common Factor (GCF) GCF & LCM Games	*Find the greatest common factor (GCF) for 40 and 32.*
60	Even/Odd Adding Even & Odd Numbers	*Will the sum of two odd numbers be odd or even? The product? The difference?*
61	Multiples of 2 and 4 Divisibility Rules	*What are the divisibility rules for 2? For 4?*
62	Multiples of 3 and 9 Divisibility Rules	*What are the divisibility rules for 3? 6? 9?*
63	Multiples of 5 and 10 Divisibility Rules	*What are the divisibility rules for 5? 10?*
64	Remainders Common Multiple Puzzle: # 1	*What is the remainder when 488 is divided by 5?*

Powers and Roots

65	Multiplying and Dividing Powers Exponents: xa/xb Rule	$x^4 \cdot x^6 =$ $x^6/x^4 =$

66	Raising Powers to Powers [Exponents: (xa)b Rule](#) [Exponents: (xy)a Rule](#) [Exponents: (x/y)a Rule](#) [Square Root](#)	$(x^4)^6 =$
67	Multiplying and Dividing Roots [Square Roots: Multiplying & Dividing](#)	$\sqrt{5} \cdot \sqrt{2} =$ $\sqrt{10} / \sqrt{2} =$
68	Simplifying Square Roots [Simplifying Square Roots $\sqrt{XY} = \sqrt{X} \cdot \sqrt{Y}$](#) [Simplifying Square Roots $\sqrt{a/b} = \sqrt{a} / \sqrt{b}$](#) [Simplifying Square Roots $(\sqrt{b}2)=b$](#) [Simplifying Square Roots $\sqrt{y}2=|y|$](#)	*Simplify $\sqrt{18}$*
69	Adding and Subtracting Roots	$2\sqrt{3} + 5\sqrt{3} =$ $2\sqrt{3} - 5\sqrt{3} =$

Fractions and Decimals

70	Reducing Fractions [Comparing Equal Fractions](#) [Using an Equivalent Fraction Chart](#)	*Reduce 9/12*
71	Adding/Subtracting Fractions [Adding & Subtracting Fractions: Part 1](#) [Adding & Subtracting Fractions: Part 2](#) [Adding Fractions with Different Denominators](#) [Subtracting Fractions from One](#)	$\frac{1}{2} + \frac{1}{3} =$ $\frac{1}{2} - \frac{1}{3} =$

7 2	Multiplying Fractions [Multiplying Fractions: Intro](#) [Multiplying Fractions: Illustrated](#) [Multiplying Proper Fractions](#) Multiplying Unit Fractions	$\frac{1}{2} \times \frac{1}{3} =$
7 3	Dividing Fractions [Countdown Challenge: Multiplying & Dividing Fractions](#)	$\frac{1}{2} / \frac{1}{3} =$
7 4	Converting a Mixed Number to an Improper Fraction [Changing Fractions to Decimals on the Computer](#) [Changing Improper Fractions to Decimals on the Computer](#) [Changing Unit Fractions to Decimals on the Computer: Part 1](#) [Changing Unit Fractions to Decimals on the Computer: Part 2](#)	*Change $2\frac{2}{3}$ to an improper fraction.*
7 5	Converting an Improper Fraction to a Mixed [Conversion Rules: Improper Fractions & Mixed Numbers](#) [Converting Improper Fractions to Mixed Numbers](#) [Converting Mixed Numbers to Improper Fractions](#)	*Convert 13/6 to a mixed number.*
7 6	Reciprocal	*What is the reciprocal of 5/8?*
7 7	Comparing Fractions [Fraction Card Game: Hand 1](#)	*Compare ½ and 1/17.*
7 8	Converting Fractions to Decimals [Test Scores as Fractions, Decimals & Percent](#)	*Change 4/5 to a decimal.*
7 9	Repeating Decimal [Looking for Patterns: Part 1](#) [Looking for Patterns: Part 2](#)	*Convert 2/11 to a decimal and the find the 9th digit.*
8 0	Identifying the Parts and the Whole [Percents and Your Grades](#)	*What is the part and what is the whole in 75%?*

Percents

8 1	Percent Formula [“Percent of:” Part 1](#) [“Percent of:” Part 2](#)	*What is 20% of 30?* *15 is what % of 30?* *30 is 5% of what number?*
8 2	Percent Increase and Decrease Word Problem Calculating Discount	*Increase 20 by 25%.*
8 3	Finding the Original Whole [Word Problem Calculating Original Price](#)	*After the 5% increase the cost of the coat was $60. What was the price before the increase?*
8 4	Combined Percent Increase and Decrease [Exploring Effective Discount](#)	*The price of a painting went up 5% one year and 5% the next year. What was the combined percent increase?*

Ratios, Proportions, and Rates

8 5	Setting up a Ratio [Writing Ratios](#)	*What is the ratio of 20 apples to 30 oranges?*
8 6	Part-to-Part and Part-to-Whole Ratios [Writing Ratios: Intro](#)	*If the ratio of boys to girls on the team is ½, what is the ratio of boys to the team?*
8 7	Solving a Proportion [Proportions: Solving for n](#)	*Solve for x* *3/5 = 12/x*
8 8	Rate [Using Proportions](#)	*If I bike at 5 miles per hour, how far will I be in three hours?*
8 9	Average Rate	*Find the average speed of a car that traveled 120 miles at 30 miles per hour and 120 miles at 50 miles per hour.*

Averages

90	Average Formula Mean: Part 2	*Find the average of the following scores: 98, 100, 100, 65.*
91	Average of Evenly Spaced Numbers	*Find the average of all the integers for 10 to 20.*
92	Using the Average to Find the Sum A Mean Word Problem	*The average of 10 numbers in 75. What is the total?*
93	Finding the Missing Number Basketball Points: Solution	*The average of 5 numbers is 40. Four of the numbers are 2, 8, 8, and 10. Find the missing number.*

Possibilities and Probabilities

94	Counting and the Possibilities Fundamental Counting Principle: Part 1 Fundamental Counting Principle: Part 2	*You have 2 pair of shoes, 2 pair of pants and 4 shirts. How many different outfits are possible?*
95	Probability Probability Formula Probability&Fractions&Decimals&Percents	*There are 4 red candies and 6 green candies in a bag. What is the probability that you will select red? Write the answer as a fraction, decimal, and percent.*

Trigonometry

96	Sine, Cosine, and Tangent of Acute Angles [Defining Sine](#) [Defining Cosine & Tangent](#) [Making and Using a Sextant](#) [Using Sine to Calculate the Height of a Kite](#) [Using Tangent to Calculate the Height of a Tree](#) [Using Tangent to Find the Distance Across a River](#)	Right triangle ABC has a hypotenuse of 13 meters. The leg opposite angle a is 5 meters and the leg opposite angle b is 12 inches. Give the ratios for • the sine of angle a; • the cosine of angle b; and • the tan of angle a
97	Cotangent, Secant, and Cosecant of Acute Angles	Right triangle ABC has a hypotenuse of 13 meters. The leg opposite angle a is 5 meters and the leg opposite angle b is 12 inches. Give the ratios for • the secant of angle a; • the cosecant of angle b; and • the cotangent of angle a.

Most Useful Ideas of Math

98	All numbers can be expressed in infinite ways.	Select your favorite name for one: 14/14, x + y/x + y, x^3/x(x^2, 12 – 11, ½ + 1/2
99	Success in math comes through perseverance. [Algebra: 100 names for One](#)	Congratulations. By completing this study guide, you have exhibited the perseverance needed to be successful in math.