

Suggestions for Tutoring ACT Math:

1. Discuss the format of the test
2. Discuss the math section components and topics covered
3. Assess using a practice test math section
4. Identify weaknesses
5. Teach content in the areas of weakness
6. Work through sample test problems together
7. Discuss strategies
8. Assign homework to be completed if student has time. Homework example: Student should complete one math section. Then student should circle wrong answers to review together during the next session.

The ACT Math test consists of 60 questions that must be answered within the 60-minute time limit. All of the math questions are five-choice, multiple-choice questions. These questions draw from six areas of math that most students have covered by the end of their 11th grade year: pre-algebra, elementary algebra, intermediate algebra, coordinate geometry, plane geometry, and trigonometry. Below you can find more detailed information about the specific skills these questions test, as well as sample ACT Math questions and answer explanations.

ACT Math Test Question Types

Math Questions (total of 60 questions)		
Math Area	Examples	# of Questions
Pre-Algebra	whole numbers, fractions, decimals, and integers; positive integer powers and square roots; ratio, proportion, and percent; multiples and factors; absolute value; one variable, linear equations; probability and counting problems; data interpretation; and mean, median, and mode	12-15 questions

Elementary Algebra	variables, polynomials, factoring, quadratic equations, linear inequalities, integer exponents, and square roots	9-12 questions
Intermediate Algebra	quadratic formula, radical and rational expressions, inequalities, absolute value, sequences, systems of equations, quadratic inequalities, functions, matrices, polynomial roots, and complex numbers	9-12 questions
Coordinate Geometry	number line graphs; graphs of points, lines, polynomials, circles, and other curves; relationships between equations and graphs; slope; properties of parallel and perpendicular lines; distance formula; midpoint formula; transformations; and conics	9-12 questions
Plane Geometry	plane figures (triangles, rectangles, parallelograms, trapezoids, circles); angles; parallel lines; perpendicular lines; translations, reflections, and rotations; 3-D geometry; perimeter, area, and volume; and logical reasoning and proofs	12-15 questions

Trigonometry	right triangle trigonometric ratios; trigonometric functions, identities, and equations; and trigonometric functions modeling	3-6 questions
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Sample ACT Math Test Questions

Pre-Algebra Question: Mean, Median, and Mode

70, 80, 50, 20, 80, 30, 80

Seven students took an art history exam. Their scores are listed above. Which of the following statements regarding the scores is true?

I. The average (arithmetic mean) is greater than 70.

II. The mode is greater than 70.

III. The median is greater than 70.

A. None

B. II only

C. I and II only

D. II and III only

E. I, II, and III

Answer: First, find the average (arithmetic mean) of the test scores. $\text{Mean} = (70 + 80 + 50 + 20 + 80 + 30 + 80)/7 = 58.57$. 58.57 is not greater than 70. Therefore, item I. is not true, and we can eliminate choices C and E. Second, find the median of the test scores. To do so, put the test scores in ascending or descending order: 20, 30, 50, 70, 80, 80, 80. The median (the number in the middle) is 70. Therefore, item III. is not true, and we can eliminate choice D. Third, find the mode of the test scores (the number that appears most frequently): 80. Therefore, item II. is true. Choice B is the correct answer.

About the ACT:

<https://www.erikthered.com/tutor/act-facts-and-faqs.html>

Practice tests:

<http://www.act.org/content/dam/act/unsecured/documents/Preparing-for-the-ACT.pdf>

https://cdn2.hubspot.net/hub/360031/file-2226679255-pdf/Documents/ACT_Test_2014-15.pdf

https://cdn2.hubspot.net/hub/360031/file-2227156987-pdf/Documents/ACT_Test_2011-12.pdf

https://cdn2.hubspot.net/hub/360031/file-2227156982-pdf/Documents/ACT_Test_2008-09.pdf

https://cdn2.hubspot.net/hub/360031/file-2227156992-pdf/Documents/ACT_Test_2005-06.pdf

http://www.fulton-ind.k12.ky.us/userfiles/62/10_ACT_Practice_Tests.pdf

<https://casstech.schools.detroitk12.org/wp-content/uploads/2013/02/Practice-Math-ACT-test-1.pdf>

Geometry lessons for ACT:

<https://magoosh.com/hs/act/2016/act-geometry-study-guide/>

<https://blog.prepscholar.com/coordinate-geometry-act-math>

<https://blog.prepscholar.com/act-math-circles-geometry-formulas-and-strategies>

<http://www.sparknotes.com/testprep/books/act/chapter10section6.rhtml>

These questions will test your knowledge of parabolas, ellipses, and circles.

Parabolas: These 'u' shaped curves open either downwards or upwards. Parabolas are the visual representation of the quadratic formula.

Circles: To figure out the equation for a circle, you need to know the radius and the location of the center of the circle.

Ellipses: If attempting to match the graph of an ellipse to the correct equation (or vice versa), make sure to pay close attention to the center of the ellipse. The center, represented as (h,k) on the equation, is one of the first things to look for as you eliminate potential answer choices.

-Equation of a Line

Good ole' $y=mx+b$. 'm' is the slope of your line, and 'b' is the y-intercept.

The initial setup of some equations will be more complicated than $y=mx+b$. If this is the case, it is your job to simplify the equation so that 'y' is by itself on one side of the equation.

-Simple Three-Dimensional Geometry

On some questions you will be asked to find the surface area, volume, or diagonal length of a cube or other rectangular solid/prism. Here are a few quick equations and tricks to remember.

Surface Area for Cube: length x width x 6. You multiply by six because a cube has six sides.

Surface Area for a Rectangular Solid: You have to do two different equations.

For the end sides of the solid, multiple length by width. Multiply this number by two.

For the longer sides, multiply length by width. Multiply this number by four.

Add the two numbers together to determine the surface area of the solid.

Volume: For any rectangular solid, there is only one way to find the volume. $\text{Volume} = \text{length} \times \text{width} \times \text{height}$.

Diagonal Length: Just like with volume, you need to know the length, width, and height. Once you have those numbers, the equation to find diagonal length is easy: $D = \sqrt{(w^2 + l^2 + h^2)}$. Don't forget the correct order of operations: square l, w, and h separately, add up the results, AND THEN take the square root!

ACT geometry questions:

https://www.varsitytutors.com/act_math-help/geometry/plane-geometry

General Geometry questions:

https://www.khanacademy.org/math/geometry/hs-geo-foundations/hs-geo-intro-euclid/e/recognizing_rays_lines_and_line_segments

<https://www.khanacademy.org/math/geometry/hs-geo-foundations/hs-geo-intro-euclid/e/drawing-lines>

https://www.khanacademy.org/math/geometry/hs-geo-foundations/hs-geo-intro-euclid/e/points_lines_and_planes

Practice, strategies, skills:

<https://www.erikthered.com/tutor/>

ACT math strategies:

<https://www.erikthered.com/tutor/act-math-strategies.pdf>

ACT math formulas:

<https://www.erikthered.com/tutor/act-facts-and-formulas.pdf>

Math worksheets:

<https://www.math-drills.com>