

Pre-Algebra (20-25%)

1. Mean, Median, and Mode

- They're simple concepts to learn, but you don't want to get them mixed up on test day.

2. Probability

- To determine probability, divide the number of particular outcomes by the number of total outcomes

2. Absolute Value

- If you see a vertical lines on either side of a number, that's absolute value. If those lines are around a negative number, treat the number like a positive number as you solve an equation.

Elementary Algebra (15-20%)

4. Writing Expressions and Equations

From time to time, you will come across a word problem that contains an algebraic expression or equation. When you see one of these questions underline this key information!

5. Multiplying Binomials

You may know this one as FOIL

6. Inequalities

The main thing to remember as you practice inequalities is that you should treat them like any other equation. THE ONLY DIFFERENCE is that when you multiply or divide by a negative number, switch the sign!

Intermediate Algebra (15-20%)

7. Relationships between the Sides of an Equation

- If multiplication (or squaring) is involved, the two sides of the equation will both go up.
- If division (or square root) is involved, one side goes up as the other goes down

8. Functions

- Function notation, compound functions

9. Logarithms

Coordinate/Plane Geometry (20-25%)

10. Conic Sections

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.

11. The 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.

12. 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. Volume = length x width x 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!

Trigonometry (5-10%)

13. SOHCAHTOA

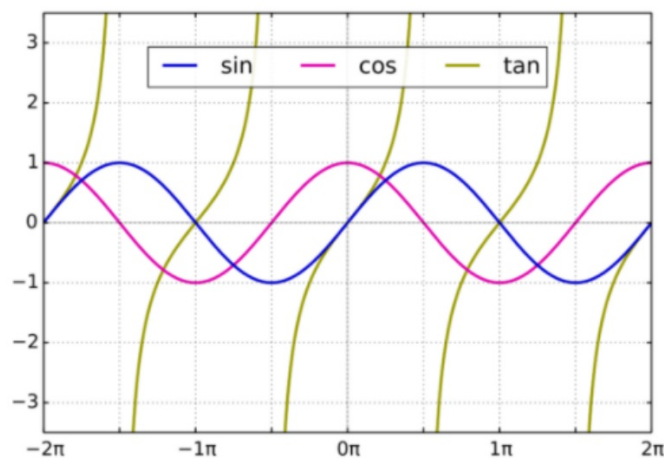
SOHCAHTOA is a great mnemonic device to remember how to calculate the sine, cosine, and tangent of any triangle.

- SOH: Sine = Opposite over Hypotenuse
- CAH: Cosine = Adjacent over Hypotenuse
- TOA: Tangent = Opposite over Adjacent

14. Solving Triangles

Applying your SOHCAHTOA knowledge to a triangle, it is possible to solve for 'x' when 'x' is the unknown length of one of the triangle's sides.

15. Trigonometric Graphs



Tips and "tricks"

Directions: The instructions on the math portion are relatively long and detailed. Don't waste time reading them on the day of the test. Get to know them now.

After solving each problem, pick the correct answer from the five given and fill in the corresponding oval on your answer sheet. Solve as many problems as you can in the time allowed. Do not worry over problems that take too much time; skip them if necessary and return to them if you have time.

2**2****MATHEMATICS TEST***60 Minutes—60 Questions*

DIRECTIONS: Solve each problem, choose the correct answer, and then fill in the corresponding oval on your answer document.

Do not linger over problems that take too much time. Solve as many as you can; then return to the others in the time you have left for this test.

You are permitted to use a calculator on this test. You may use your calculator for any problems you choose,

but some of the problems may best be done without using a calculator.

Note: Unless otherwise stated, all of the following should be assumed.

1. Illustrative figures are NOT necessarily drawn to scale.
2. Geometric figures lie in a plane.
3. The word *line* indicates a straight line.
4. The word *average* indicates arithmetic mean.

“Solve each problem, choose the correct answer, and then fill in the corresponding oval on your answer document.”

Calculators are allowed on the exam, all graphing and scientific are allowed except those listed below

What kind of calculators aren't allowed?

- Laptop, tablet, or handheld computer
- Calculator with a QWERT keypad
- Electronic writing pad
- Cell phone calculator
- Calculators with built-in computer algebra systems, including:
 - All Texas Instruments beginning with TI-89, TI-92, and TI-Nspire
 - All Hewlett Packard models beginning with HP48GII, HP 40G, HP 49G, and HP 50G
 - All Casios beginning with CFX-9970G, Algebra fx 2.0, and ClassPads

Please note that the TI-89 is NOT permitted. Use of this calculator is the most common reason students are dismissed during the test!

Approach every ACT math question with the same method

1. Read the question
2. Look at the information provided in the question and the **answer choices**
3. Solve:
 - Backsolve
 - Pick Numbers
 - Use Traditional Math
 - Strategically Guess
4. Check to make sure that you answered the specific question that was asked.

Pick Numbers to avoid complicated algebra

Skip using involved algebraic equations by picking numbers for variables. Avoid picking 0 or 1 because they have special properties.

Backsolve to save time

You can backsolve when you see integers in the answer choices. Start with answer choice C/H unless the question asks for the smallest or largest value.

Strategically Guess

When all else fails, make an educated guess. This means

Translate words into math

Translate the words in the question into math so that you can solve more easily. Remember that "of" means to multiply.

Understand ACT math relationships

Know the difference between values, ratios, and percents. A ratio is a relationship between numbers. The ACT test-makers value being able to move easily between percents, fractions, and decimals.

Know your triangles

You must know the 30-60-90 and 45-45-90 rules. The ACT does not provide this information at the beginning of the math section, so be sure to memorize this information ahead of time. Also look out for Pythagorean triplets (3:4:5 and 5:12:13 and their multiples).

Find common shapes

Find common shapes on the ACT to help you break complex figures into simple polygons. Look in particular for triangles!

When the ACT does NOT mention “Note: Figure not drawn to scale,” you can use the figure to your advantage!

Recognize “red flags”

Be on the lookout for common trap answers on the ACT. This includes oddball answers and answers that are too small or too big.