

TAKE ACTION ON

# THE ACT

2022-2023

Your ultimate guide to study tips, test-taking strategies, and practice questions.

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*Additional practice problems at [actstudent.org](http://actstudent.org)*

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WOODWARD HINES EDUCATION FOUNDATION



# GENERAL TEST-TAKING TIPS

## HOW TO THINK ABOUT THE ACT



In order to do the best you can, you need to work on four main areas: content, endurance, testing strategies, and time management. If you don't know basic math content, strategies and endurance are not going to matter much. Build your endurance so that you can sit comfortably taking a test for 3+ hours. Know the strategies well enough to use them during the test without having to think about them too much. Finally, pace yourself to make sure that you can complete the entire test.

$$\text{CONTENT KNOWLEDGE} + \text{STRATEGIES} + \text{ENDURANCE} + \frac{\text{ACCURACY}}{\text{SPEED}}$$

= HIGH ACT SCORE

These skills can be developed, but developing them means that practice is necessary!

Think of the ACT as a basketball game. It would be absurd for a basketball team to play a game without practicing for it. Usually, teams practice for several weeks before their first game, even if it is a game against an inferior team. For big games, the practice sessions are more frequent and more intense. So before you take the ACT, you need to practice ACT strategy fundamentals!



### How much should you study prior to the test?

That depends. Some professionals recommend practicing almost every day for several weeks before the test, while others recommend taking a certain number of practice tests. In the end, it is up to you. These two things are clear:

1. Be consistent with your studying and make sure to take practice exams. Then take time analyzing what you missed and why. Visit [get2college.org/act-prep](http://get2college.org/act-prep) to view practice tests!
2. Cramming for the ACT won't work!
3. Commit to studying for the ACT 15-20 minutes every day. For example, you can work ten math questions or complete one English passage.

## IMPORTANT SMALL THINGS

The ACT is a long test, which requires stamina on your part. It is important for you to have a game plan.



- **Make sure you are well rested before you take the test.** Most students need more than eight hours of sleep per night in order to be well rested. Several nights prior to your test, make sure you are sleeping well and long enough.
  - **Eat a good, well-balanced breakfast.** Give your body some time to digest breakfast before the test. However, make sure your breakfast is filling enough to keep you from being hungry during the test. Also, eat a good snack during your break.
  - **Have a stress management plan.** Manage your stress during the test by taking deep breaths often, stretching when needed, and sitting up straight. Do what you need to do in order to remain calm.
- **Don't psych yourself out during the test!** For example, if you have answered "B" four times in a row and you are tempted to do so again, don't think to yourself, "Well, I've answered B four times in a row. This next answer can't be B." It very well might be B.
  - **Stay active during the test.** Use the process of elimination, write, underline, circle, and draw on the test. This physical interaction will keep you engaged! Also, be sure not to lay your head down after you finish a section.

## PROCESS OF ELIMINATION (POE)

Every multiple choice question on the ACT has three wrong answers and only one correct answer, except for math questions which have four wrong answers and only one correct answer. By looking for the wrong answers instead of the correct ones, you will often be left with just a few answer choices from which you can make an educated guess. If you can narrow down your choices to two answers by Process of Elimination (POE), you have a 50/50 chance at guessing the right one, even if you don't know what the right answer actually is. You won't know the correct answer on every question, so use your POE skills to make educated guesses.

“  
THERE IS NO  
GUESSING  
PENALTY ON  
THE ACT.

This means that you should  
fill in an answer on all 215  
questions on the ACT

”



## GUESSING BLINDLY

There are a few questions in each section that many students have absolutely no clue how to solve. When this happens, you want to make sure to make a guess. You have a  $\frac{1}{4}$  or  $\frac{1}{5}$  chance of getting the question right. But, don't just guess in a random way! Pick a spot of the day. It doesn't matter which spot you pick — the second spot (B or G), the third spot (C or H), etc. It does matter whether you pick the same spot when you have no idea how to eliminate any of the answers. Picking the same spot each time maximizes your chances of getting some of those questions right.

## ORDER OF DIFFICULTY

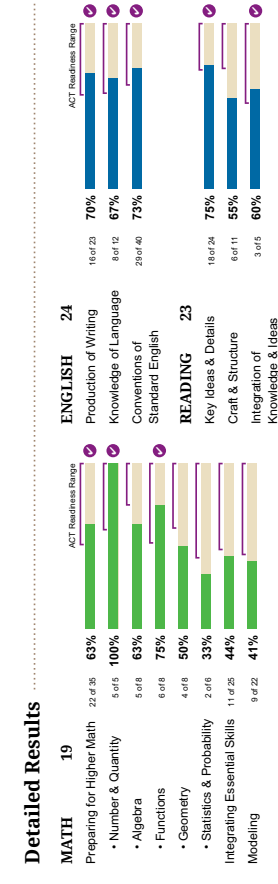
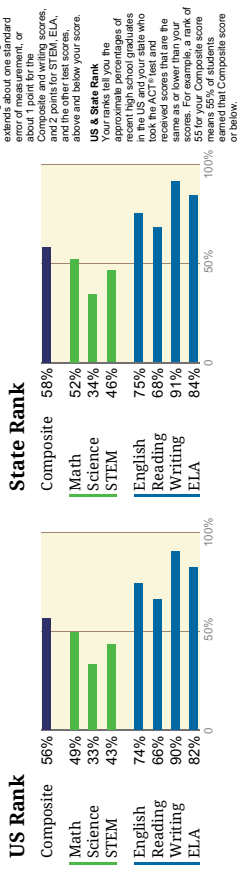
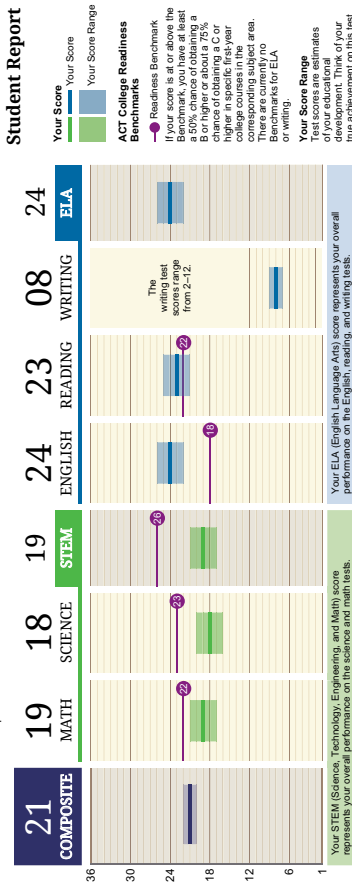
Manage your time effectively. Determining the order of difficulty on each section helps you. The proctor will not check to make sure you are answering the questions in numerical order, so it is better to skip around and answer the questions from easiest to hardest. Managing your time is difficult. Being able to identify easy, medium, and hard questions helps you to use your time better. It also helps you concentrate on the questions you are likely to answer correctly.

## TIME MANAGEMENT

Most students can't do well on the ACT without managing their time properly. You are not allowed to use cell phones during the test, and testing centers might not be well equipped with clocks or timers, so you should wear a watch during the test. It needs to be one that doesn't make any noise. Ideally, you should wear a watch with a stopwatch (no sound) function that allows you to set the timer for each section of the test.







**ACT Composite Score:** ACT math, science, English, and reading test scores and the Composite score range from 1 to 36. For each test, we converted your number of correct answers into a score within that range. Your Composite score is the average of your scores on the four subjects rounded to the nearest whole number. If you left any test completely blank, that score is reported as two dashes and no Composite score is calculated.

**ACT Readiness Range:** This range shows where a student who has met the ACT College Readiness Benchmark on the assessment would typically perform.

## Sending Your Scores

A score report (including your photo) was automatically sent to the high school you reported when registration was completed for the test. Your school will use this information for counseling, evaluating the effectiveness of instruction, and planning changes and improvements in the curriculum.

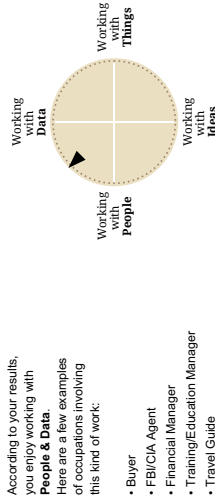
At your direction, your scores from this test date are also being reported to the colleges shown. (Be aware that when you send a report to a college that is part of a school system, the college may share your score with other colleges in that system.) Institutions use your test scores along with high school grades, academic preparation, out-of-class accomplishments, future plans, and other factors to help identify applicants who can benefit most from their programs. In addition, colleges can use results on the ACT to assist scholarship/loan agencies in identifying qualified candidates, place students in first-year courses, and help students develop an appropriate program of study.

If you entered a college code incorrectly or forgot to include one, don't worry! You can still send scores to other colleges. Visit [www.act.org/the-act/scores](http://www.act.org/the-act/scores) to explore student resources or to order additional score reports.

- 1 UNIVERSITY OF OMEGA  
[www.universityofomega.edu](http://www.universityofomega.edu)
- 2 ALPHA UNIVERSITY  
[www.alpha.edu](http://www.alpha.edu)
- 3 BETA COMMUNITY COLLEGE  
[www.betacollege.edu](http://www.betacollege.edu)
- 4 MAGNA COLLEGE  
[www.magna.edu](http://www.magna.edu)

## College and Career Planning

Where are you going? Knowing your interests can help you find the kinds of majors and occupations that may be right for you. Occupations differ widely in how much they involve working with four basic work tasks: Data, Ideas, People, and Things. Before you took the ACT, you completed an interest inventory. Your results point to occupations that involve the kinds of basic work tasks you prefer. Visit [www.actprofile.org](http://www.actprofile.org) to learn more.



## Interest-Major Fit

Do your interests fit the college major you plan to enter? Based on information you provided, you plan to enter Accounting.



## Progress Toward the ACT National Career Readiness Certificate™

Based on your ACT Composite score, this indicator provides an early estimate of your future achievement on the ACT National Career Readiness Certificate (ACT NCRC™). The ACT NCRC is an assessment-based credential that documents foundational work skills important for job success across industries and occupations. Visit [workforce.act.org/credential](http://workforce.act.org/credential) to learn more.



You are making progress toward a Gold level on the ACT NCRC.

## Where Are You Going?

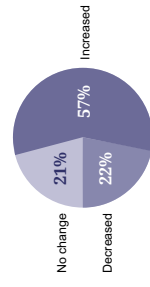
Go to [www.actprofile.org](http://www.actprofile.org) to learn more about yourself and find out about careers, majors, and colleges that may be right for you. It's free!

## Retesting with the ACT

Consider retesting if one or more of the following applies to you:

- Did you have any problems during the tests, like misunderstanding the directions or feeling ill?
- Do you think your scores do not accurately represent your abilities?
- Are your ACT scores not what you expected based on your high school grades?
- Have you taken more coursework or an intensive review in the areas covered?
- Do you want to apply to a college that requires or recommends the writing test?

## Typical Composite Score on a Retest



Go to [www.act.org/the-act/retesting](http://www.act.org/the-act/retesting) for more information.

## Test Security Hotline

If you have concerns about the security of the tests, please report them at [www.act.ethicspoint.com](http://www.act.ethicspoint.com) or 855.382.2845.

# MATH SECTION

## ABOUT YOUR CALCULATOR

- Use it as a tool not a crutch
- Check for fresh batteries
- Practice testing with it
- Don't rely on the memory function

## THE BREAKDOWN

# of Questions	Time (mins)	Content
60	60	Pre-algebra, elementary algebra, intermediate algebra, coordinate geometry, plane geometry, and elementary trigonometry

The ACT Math section tests relatively simple math concepts presented in obscure ways. There are no excuses for being surprised by the type of questions asked on the ACT Math section. Below is a sample of questions the ACT Math section may contain. The actual number of questions in each subject may change.

### 33 Algebra Questions

- Pre-Algebra questions will be based on basic number theory and manipulation of fractions and decimals.
- Algebra I/Elementary Algebra questions will be based on linear equations, ratios, percentages, etc.
- Algebra II/Intermediate Algebra questions will be based on exponents, roots, quadratics, etc.

### 23 Geometry Questions

- Plane Geometry questions will be based on angles, shapes, etc.
- Coordinate Geometry questions will be based on slope, graphing, midpoint, etc.

### 4 Trigonometry Questions

- Elementary Trigonometry questions will be based on sine, cosine, tangent, trigonometric identities, trigonometric functions, etc. Note: Although this is a sample of how many questions may be asked in each subject, you can be confident that the majority of questions on the ACT Math test will be from Algebra and Geometry. Focus your time studying these subjects!

## GENERAL MATH SECTION QUICK FACTS

In general, the easier questions tend to come at the beginning of the math section, and the difficult questions tend to come at the end.

- An easy math question is one that will likely take you less than a minute to complete.
- A medium math question will take you a little longer, possibly right at a minute.
- A hard math question will likely take you longer than a minute to solve, possibly even several minutes.

Keep in mind that these are general guidelines. That means that you might see a difficult math question in the middle of the section or an easy question towards the end. Sometimes, this can mean there is an additional step such as a conversion to complete before solving the problem.

## TIPS ON APPROACHING THE MATH SECTION

The first time you work through the Math section, complete all of the easy questions immediately. These will typically be among the first 30 questions. Be sure to avoid making careless mistakes. Mark the medium questions as you proceed. These will be the questions that you think you can work but may take some extra time. When you see hard questions, ones that you have no idea how to solve, pick your spot of the day and move along. But remember, if you can eliminate one answer choice before picking your spot of the day, you increase your chances of getting the correct answer.

### **TIP** Avoid doing math when you can.

**1** This means knowing how to use your calculator wisely, applying the strategies, and using logic instead of formulas whenever possible. Remember this distinction: there is a difference between getting the mathematically correct answer and figuring out enough about the problem to estimate the correct answer. You only have to do enough math to eliminate the wrong answers!

### **TIP** Break down word problems.

**2** Ask yourself what the answers represent. Usually, the question at the end of the word problem will help. Break the problem into sections, using only the information you need in order to solve the problem. Writing down the different sections helps you organize the problem in your mind.

Remember: a word problem is just a regular math problem with more words. Here is the same problem presented in two different ways:

A. 160 students went on a trip to Washington, D.C. If there were 28 more girls than boys on the trip, how many boys went on the trip?

B.  $X + X + 28 = 160$

### **TIP** Answers on the ACT Math section are usually ordered (from least to greatest or greatest to least).

**3** This means you should always start with answer choice C. If it isn't the right answer, you can eliminate other answers as well. For example, if C is too small a number, and the order of answers is least to greatest, you know that D or E has to be the right answer. If you work the problem and D is also too small, you know that E is the right answer without even testing it.

### **TIP** Pace yourself.

**4** Math is the longest section in regard to how much time you have. Pace yourself accordingly. Most students do NOT finish the math portion, and it is purposefully designed that way. If you can get half of the problems right, you are hitting the national average.

### **TIP** Wear a watch.

**5** Track the amount of time spent on each problem. Make sure you are not wasting too much time working on one problem.

## MATH TERMS AND FUNDAMENTALS

You cannot use the math strategies effectively if you do not know mathematics fundamentals, such as definitions, order of operations, etc. Below are some math fundamentals you will find helpful on the ACT Math section. If you are unfamiliar with the terminology or concepts and you realize that you need remedial work, seek additional help as soon as possible.

Key Term	Definition
Integer	Any number that is not a fraction
Real Number	Any rational or irrational number
Rational Number	Any integer or fraction
Prime Number	Any number divisible by only one and itself
Remainder	The number left over when one integer is divided by another
Absolute Value	The distance a number is from zero
Product	Multiply
Quotient	Divide
Sum	Add
Difference	Subtract
Consecutive	Integers in a sequence
Distinct	Non-repeats
Union	The collection of elements that lie in sets A, B, or both
Intersection	The point where two lines meet
Ratio	A comparison between two amounts. Ratios can be written in a few different ways: <b>A/B   “The ratio of A to B”   A:B</b>
Fraction	A fraction is the relation between a part to its whole
Proportion	A proportion is the relation between two quantities. Direct variation is simply another term for a proportion. As one quantity goes up, so does the other. Indirect variation is the exact opposite, when one quantity goes up as the other goes down.
Diameter	A straight line going through the middle of a circle connecting two points on a circumference
Radius	Half of the diameter; A straight line from one point on the circumference of a circle to the center point
Pi	The ratio of a circle’s circumference to its diameter; it is approximately 3.14
Hypotenuse	The side opposite of the right angle in a right triangle





Plugging in comes in handy often during the second half of the math section!

## ALGEBRA TACTICS

Now that you have been reminded about the kinds of basic math operations you need to know, it's time for some specific math strategies. There are two main tactics that help you avoid doing complicated algebra: Plugging In and Using the Answer. These two strategies will help you solve many of the ACT Math problems. Avoiding algebra helps you turn complex algebra problems into problems that your calculator can solve. Because the ACT doesn't require you to solve problems the "right" way, your goal should simply be to solve problems as quickly as possible. Less algebra = less time and fewer mistakes!

REMEMBER

The answer choices are typically in order. Always start with the middle answer (C or H). If you learn that answer is too high or too low, you will know which answer to try next and which ones you can eliminate

### TACTIC 1: PLUGGING IN

Plugging in your own number allows you to avoid using algebra to solve ACT Math problems. Algebra works great when you are in math class and you have to solve each problem by showing work for each step in order to get full credit. In many cases, using algebraic formulas on the ACT can cost you time. Remember, you don't get extra points on the ACT for working the problem out the "right way." **Use this tactic whenever you see a variable in the problem and the answer choices.** Look for key words such as "in terms of." Here are the steps you should take to use this tactic:



1. **Set up the problem** and choose different numbers to represent each variable. Assign each variable a different number. Do not use 1 or 0 for your numbers. These numbers cause you to calculate the same answer for multiple answer choices. Pick numbers that make sense. For example, if you are working a problem about percentages, use numbers that are multiples of 10.
2. **Solve** the problem using the answers you chose.
3. **Write down the answer** you find and circle it. This is your target number.
4. **Plug in** your numbers into the variables in the answer choices and perform the calculations. Remember to begin with answer choice C or H. When your target matches one of the answers, that's the answer you should select.

## EXAMPLE 1

If the sum of three consecutive odd integers is  $p$ , then in terms of  $p$ , what is the greatest of these three integers?

- A.  $(p-6)/3$
- B.  $(p-3)/3$
- C.  $p/3$
- D.  $(p+3)/3$
- E.  $(p+6)/3$

Answer on pg 35

**Step 1:** Pick three consecutive odd integers. Do not use 1 or 0.

**Step 2:** Solve the problem using your numbers. What is the sum of the 3 consecutive odd integers you chose? This answer will represent  $p$  in the answer choices.

**Step 3:** What is the question asking? It's asking for the greatest of the three integers. What is the greatest of the three integers you chose? That's your target.

**Step 4:** Solve the answer choices using the numbers you chose. Plug in your answer for  $p$  to find the correct target.

## TACTIC 2: USING THE ANSWER

This tactic allows you to work the problem backwards to solve questions quickly and turn difficult questions into easy ones. Use this tactic when there are numbers in the answer choices or you feel the urge to write out a long algebraic expression. Here are the steps to using this tactic:

## EXAMPLE 2

Marc is half as old as Tony and three times as old as Ben. If the sum of their ages is 40, how old is Marc?

- A. 3
- B. 16
- C. 12
- D. 18
- E. 24

**Step 1:** Whose ages are represented in the answer choices? Label the answer choices.

**Step 2:** Solve the problem using the answer choices, beginning with C. How do we get from Marc's age to Tony's age? How do we get from Marc's age, to Ben's age?

Answer on pg 35

1. Label the answer choices so you know what they represent.
2. Solve the problem using the answer choices, beginning with C. How do we get from Marc's age to Tony's age? How do we get from Marc's age, to Ben's age?

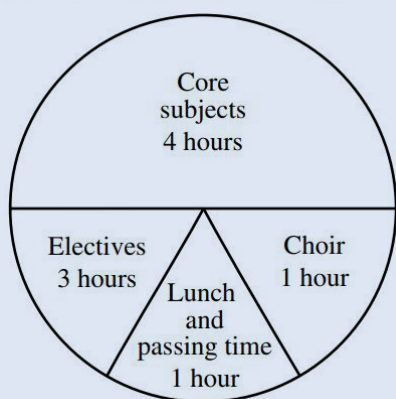
Marc's Age		Tony's Age		Ben's Age	=
A. 3	+	_____	+	_____	40
B. 6	+	_____	+	_____	40
C. 12	+	_____	+	_____	40
D. 18	+	_____	+	_____	40
E. 24	+	_____	+	_____	40

## GEOMETRY TACTICS

Many of the geometry problems are not difficult to solve. The trick is figuring out how to solve them without spending too much time doing so. For any geometry problem, make sure to do the following:

- If a figure is given, label it with all the information that is given in the problem.
- If there is no picture, draw your own.
- Remember to study your formulas!
- Solve the problem using logic and critical thinking whenever possible. Use your eyes to eliminate illogical answers.

### EXAMPLE 3



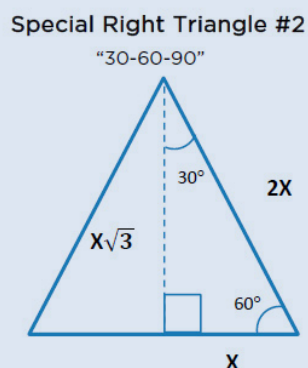
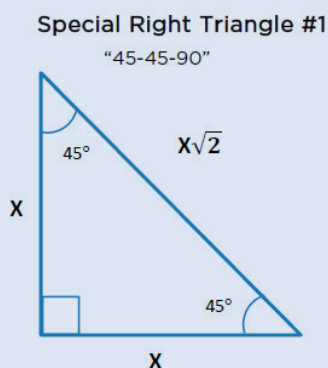
Antwan drew the circle graph describing his time spent at school in 1 day. His teacher said that the numbers of hours listed were correct, but that the central angle measures for the sectors were not correct. What should be the central angle measure for the Core subjects sector?

- A.  $72^\circ$
- B.  $80^\circ$
- C.  $160^\circ$
- D.  $200^\circ$
- E.  $288^\circ$

Answer on pg 35

The top half of the circle is made up of 4 hours. The bottom half is 5 hours. They should not take up the same amount of space. The top portion should be a little less than half. Straight lines are at a  $180^\circ$  angle. Which answer choice is a little less than  $180^\circ$ ?

You will benefit from knowing the properties of special right triangles. Knowing these will help you avoid taking extra time to use the Pythagorean Theorem.



Remember common Pythagorean Triples such as 3-4-5 and 5-12-13.



# FORMULAS

You will not be given any formulas on the ACT. That means you need to memorize the formulas that are most helpful. The following formulas and properties are typically tested on the ACT:

$$r^2 = (x - h)^2 + (y - k)^2$$

*Equation of a Circle\*\**

$$= \frac{1}{2}(\text{base})(\text{height})$$

*Area of a Triangle*

$$= (\text{base})(\text{height})$$

*Area of a Square/Rectangle*

$$= (\text{length})(\text{width})(\text{height})$$

*Volume of a Rectangular Solid*

$$= \pi r^2$$

*Area of a Circle*

$$= 2\pi r \text{ or } \pi d$$

*Circumference of a Circle*

$$A^2 + B^2 = C^2$$

*Pythagorean Theorem\**

$$\frac{y_2 - y_1}{x_2 - x_1}$$

*Slope Formula*

$$= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

*Distance Formula*

$$\left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

*Midpoint Formula*

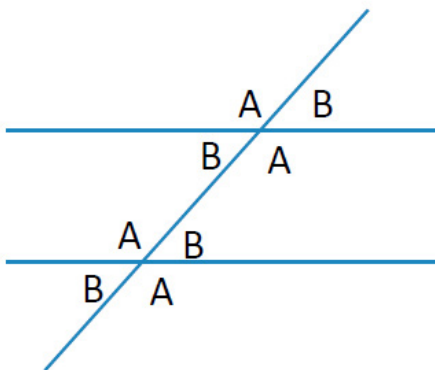
$$\text{sine} = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\text{cosine} = \frac{\text{adjacent}}{\text{hypotenuse}}$$

$$\text{tangent} = \frac{\text{opposite}}{\text{adjacent}}$$

*Trigonometric Functions*

When a third line cuts across two parallel lines, the small angles are all equal and the large angles are all equal. The sum of a small angle and a large angle is equal to  $180^\circ$ .



$$A + B = 180$$

**Perimeter = sum of all sides**

**A line is a  $180^\circ$  degree angle**

The sum of the interior angles of a triangle is  $180^\circ$ . The sum of the interior angles of a four-sided polygon is  $360^\circ$ . Add  $180^\circ$  to the sum of the interior angles for each additional side added to a polygon.

The **slope-intercept** equation of a line is  $y = mx + b$  where  $m$  is the slope and  $b$  is the  $y$ -intercept.

**Parallel lines** always have the same slope. Perpendicular lines always have opposite reciprocal slopes.

\* Used only with right triangles, where  $a$  and  $b$  are legs, and  $c$  is the hypotenuse.

\*\*  $(h,k)$  represents the center point of the circle