The 70 most common math skills from the last 10 SATs

Some things show up all the time on the SAT. Other things don't. I need to know this information in order to make the questions and question-selection algorithms for **Mathchops**. So I went through every question from the last 10 released SATs and figured out which skills showed up. Then one of my partners helped me make a Python script and we did a bunch of data analysis. What follows is a list of the most common types. The number in parentheses refers to how many times it showed up (out of 580 questions).

Slope (65 times) – Use the slope formula. Go back and forth from equation to graph. Find the equation when given two points. Find the slope based on a word problem.
System of equations (50) – Substitution, elimination, multiply then eliminate.
Y-intercept (49) – Usually either asking you to plug in 0 for x or figure it out based on the wordy description.
Plug in (46) – You have a value or a point that needs to be plugged into an equation or function.
Algebra translation (46) – Convert a word problem into an equation.
Ratio (33) – Part:part, part:whole.
Percent (32) – All variations: basic, increase/decrease, markup, discount.
Functions (31) – The basic f(x) notation is used extensively.
Tables (30) – Other question types (slope, probability) are presented in table form.
Combine like terms (29) – Frequently included in other question types.
Read the graph (27) – Many are quite basic questions, like finding the highest point on a line graph.
Distribute (25) – As in 3(x + 2) = 3x + 6.
Fractions (24) – Evenly split between calculator and non-calculator, but usually a part of something else. You would not be directly tested on something like 3/4 + 5/7.
Exponential growth (21) – Be comfortable with this: Final = Initial(1+/- rate)^time. Sometimes there are fractional exponents.
Factoring (20) – The basics, plus zero product property, difference of two squares, perfect square trinomials, factor by grouping, u-substitution.
Radicals (20) – Arithmetic operation, translate to fractional power, solve as part of an equation.
Median (20) – Presented lots of ways: word problem, table, box and whisker plot, value/frequency histogram.
Slope formula (19) – Find the slope when given two points.
Meaning of a constant (18) – Usually a slope or y-intercept in a word problem.
Line of best fit (18) – These are usually just slope questions. Sometimes they ask about specific points.
Answer is not x (18) – You might solve for x but then be asked, "What is 2x - 3?"
Pick numbers (15) – This is never required but is often helpful.
Probability (14) – Almost all probability questions are in the form of table data. The key is to identify the numerator and the denominator: "What is the probability of selecting a female from the group of left-handed students?"

Isolate variable (13) – These usually require several algebraic moves (+/- from both sides, factor something out).
FOIL (13) – Usually just the basics, as in (x+3)(x-4).
Questions about a study (13) – Often something about margin of error or the setup of the study.
Substitution (systems) (12) – If y = 3x + 2 and 3x + 4y = 10, what is the value of x?
Conversion (12) – They give you the conversion but you have to execute it correctly (oz/pounds, $5/pound, etc.)
Exponents (11) – All basic operations, fractional, negative.
Negatives (11) – Arithmetic, distributing the negative over a parenthesis. Like fractions, they aren't directly tested.
Similar triangles (11) – Set up a proportion based on similar triangles.
Average (11) – Arithmetic mean. Mostly basic but a few advanced ones, like the average sum trick.
Elimination (systems) (11) – If 2x + y = 10 and 2x - 3y = 2, what is the value of y?
Function shifts (11) – Mostly parabolas. Sometimes helpful to know -b/2a.
Plug in zero for intercept (11) – If 3x + 4y = 24, what is the x-intercept? Equations and word problems.
Fractional exponent (10) – Rewrite radicals as fractional exponents and vice versa.
Plug in answers (10) – Like picking numbers, it’s not required but it’s often helpful.
Inequality (9) – Usually something like 2x + 8 < 12, although you sometimes have to graph a system of linear inequalities.
Angle chasing (9) – 180 in a line, 180 in a triangle, corresponding angles, vertical angles.
Square both sides (8) – It's often better to plug in the answers but sometimes you have to square both sides to get rid of the radical.
Match constants (8) – If 3x + 4y = ax + by, what is a + b?
Given graph, find equation (7) – Usually a linear equation, testing your knowledge of slope and y-intercept.
Rectangle area (7) – Basic or part of an algebraic word problem, sometimes quadratic.
Algebra LCD (7) – Something like x/(x+2) + 2x/(x+3).
Distribute negative (6) – A common trap in equations.
No solution (6) – If ax + 4 = 5x + 8, what value of 'a' would result in zero solutions?
Box and whisker plot (6) – Usually asks for the median or range. The toughest one asks you to identify the correct plot based on the data.
Quadratic and linear system (6) – These almost always require the substitution method and sometimes involve other skills, like factoring.
Perpendicular (6) – Know that perpendicular lines have negative, reciprocal slopes.
30:60:90 (6) – Know the side/angle relationships for 30_60_90 triangles.
U-substitution (6) – An advanced factoring technique.
Infinite solutions (6) – If ax + 4 = 5x + 4, what value of 'a' would result in infinite solutions?
Standard deviation (6) – Just know that S.D. is related to how spread out the data points are.
Factor out constant (6) – As in converting 3x + 6 into 3(x+2). Usually part of the factoring process.

SOHCAHTOA (5) – Set up the basic ratios. Know that similar triangles have the same trig ratios. Sometimes combined with the Pythagorean Theorem.
Range (5) – Table, box and whisker plot, list of numbers.
Difference of two squares (5) – This has to be automatic – often part of something else.
Percent increase (5) – The price was $20. Now it's $28. What's the percent increase?
Value/frequency (5) – Bar graph or table. Usually part of a median or arithmetic mean question.
Percent decrease (5) – The price was $80. Now it's $60. What's the percent decrease?
Pythagorean theorem (5) – Often combined with SOHCAHTOA or similar triangles.
-b/2a (5) – Use this to find the x-coordinate of the vertex.
Perfect square trinomial (5) – Useful for completing the square. Sometimes required as part of a multistep solution.
Scales don’t match (5) – The origin won't be included, or the scales increase at different rates.
Circle equation (5) – Know horizontal and vertical shifts, how to find the radius. You sometimes need to complete the square.
Margin of error (5) – You just have to be familiar with the concept. You don't have to calculate it.
c = product of roots, b = -sum (4) – Use when in x^2 + bx + c form. Usually not required but often helpful.
What happens when you add a number? (4) – Know how outliers affect the mean and median.
Imaginary numbers (4) – Usually i^2 = -1 or combining like terms.
X minus root is a factor (4) – If 3 is a root of a polynomial, then (x-3) is a factor of the polynomial.