



SAT Math Packet

For students using The Official SAT Study Guide, 2nd Edition by the College Board: next to each rule you will see a list of page and question numbers that coincide with this book.

We guarantee you will be able to use each of these math strategies on the SAT.

Plugging in Numbers. This is the most important strategy on the Math portion of the SAT.

p. 581 #3, p. 585 #18, p. 594 #5, p. 597 #12, p. 611 #9, p. 613 #13, p. 613 #16, p. 640 #8, p. 642 #16 and #18, p. 670 #14, p. 700 #3, p. 702 #10, p. 730 #5, p. 732 #11, p. 733 #15 and 16, p. 769 #3, p. 770 #7, p. 786 #3, p. 787 #9, p. 788 #11, p. 796 #3, p. 797 #9 and #10

Knowing Rules of Exponents. Master this strategy by memorizing:

Notice the difference?

$$\begin{array}{l} \nearrow x^3 \cdot x^4 = x^7 \\ \searrow (x^3)^4 = x^{12} \end{array}$$

p. 422 #8, p. 529 #11, p. 581 #2, p. 611 #7, p. 652 #6, p. 669 #7, p. 670 #14, p. 703 #13, p. 714 #8, p. 788 #11, p. 789 #15, p. 790 #19, p. 831 #5, p. 835 #15, p. 891 #15, p. 919 #16, p. 979 #7, p. 980 #11

Proportions. The hardest thing about proportion questions is being able to recognize them. The way to recognize a proportion question is when they give you 3 pieces of information and ask you to find a fourth piece.

For example: You are given the **height** of **two** cones and the **base** of **one** of the cones and asked to find the base of the other cone, this is a proportion question.

The best way for you to get good at spotting other proportion questions is to do a bunch of them back to back. Ratios and proportions are very similar. Ratios are fractions. Ratios can always be rewritten as fractions.

p. 860 #12, p. 861 #15, #16, p. 906 #12, p. 918 #11, p. 950 #7, p. 966 #6

Slope. Know the basics of how to figure out the slope of a line. Remember:

$$\text{SLOPE} = \frac{\Delta y}{\Delta x} \text{ or } \frac{Y_2 - Y_1}{X_2 - X_1}$$

If a line is rising as it goes left to right, it has a **positive** slope

If a line is falling as it goes from left to right, it has a **negative** slope.

p. 400 #15, p. 464 #6, p. 546 #10, p. 585 #16, p. 609 #2, p. 703 #14, p. 788 #12, p. 798 #11, p. 850 #14, p. 859 #9, p. 887 #4, p. 888 #8, p. 917 #7, p. 918 #13, p. 953 #17, p. 970 #18

If a problem gives you the average of a group of numbers, you should multiply this average by the number of numbers. This will give you the sum of the numbers. Figuring out the sum of the numbers is usually the key step needed to solve the problem. Here is the rule graphically:

$$(\text{AVERAGE}) \times (\# \text{ OF ITEMS}) = \text{SUM OF THE ITEMS}$$

p. 397 #3, p. 421 #7, p. 464 #3, p. 467 #13, p. 517 #11, p. 525 #1, p. 544 #3, p. 701 #5, p. 713 #3, p. 732 #11, p. 770 #8, p. 786 #6, p. 834 #12, p. 835 #18, p. 859 #7, p. 886 #2, p. 891 #16, p. 905 #7, p. 967 #7

Know the terms arithmetic mean, median, and mode.

- Arithmetic mean- is just another word for average. So just find the average of the numbers.
- Median- the number that comes in the middle if you line the numbers up from smallest to biggest.
- Mode- the number the appears the most frequently.

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p. 423 #13, p. 455 #12, p. 584 #13, p. 654 #12, p. 703 #14, p. 770 #8, p. 852 #19, p. 888 #6, p. 953 #18

The simplest way to solve a **probability** question is to use this concept:

$$\mathbf{Probability} = \frac{\mathbf{PART}}{\mathbf{WHOLE}} \quad \frac{\mathbf{(Part\ that\ they\ are\ asking\ about)}}{\mathbf{(Total\ number\ of\ items)}}$$

p. 417 #11, p. 483 #8, p. 514 #2, p. 583 #7, p. 641 #12,
p. 731 #10, p. 795 #1, p. 858 #5, p. 916 #4, p. 978 #3

The simplest way to do a **percent** question uses the exact same concept:

$$\mathbf{Percent} = \frac{\mathbf{PART}}{\mathbf{WHOLE}} \quad \frac{\mathbf{(Part\ that\ they\ are\ asking\ about)}}{\mathbf{(Total\ number\ of\ items)}}$$

p. 415 #8, p. 424 #15, p. 486 #15, p. 515 #4, p. 517 #13, p. 518 #15, p.
586 #20, p. 613 #13, p. 670 #12, p. 796 #3, p. 834 #13, p. 848 #5, p. 861
#15, p. 949 #5

Strange Symbol Question- There are a few questions on each SAT that use some strange symbol that you have never seen before. That's because the SAT invented these symbols specifically for the test. Read these questions carefully so you understand what the question is asking you to do.

p. 420 #3, p. 456 #15, p. 468 #16, p. 543 #2, p. 585 #17, p. 670 #11, p. 705 #20, p. 800 #20, p. 835 #17, p. 861 #13, 14, p. 890 #11, p. 967 #10

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p. 399 #11, p. 611 #9, p. 643 #20, p. 835 #17, p. 949 #6

Questions involving remainders are the only type of question that you can't use a calculator to solve. You must work these out by hand.

Pythagorean Theorem- The SAT tests you on this formula frequently! On any question involving a right triangle, this should be the first formula you think of.

p. 526 #5, p. 545 #8, p. 613 #15, p. 643 #19, p. 652 #7, p. 655 #18, p. 789 #16, p. 800 #15, p. 832 #7, p. 888 #5, p. 908 #20, p. 953 #15, p. 969 #15, p. 970 #18

Parallel lines have equal slopes.

Perpendicular lines have slopes that are negative reciprocals.

p. 400 #18, p. 418 #18, p. 422 #9, p. 424 #16, p. 467 #14, p. 482 #3, p. 517 #10, p. 518 #16, p. 519 #19, p. 547 #14, p. 583 #10, p. 594 #4, p. 597 #16, p. 610 #5, p. 639 #4, p. 641 #13, p. 652 #8, p. 654 #13, p. 669 #6, p. 671 #15, p. 702 #9, p. 704 #17, p. 731 #8, p. 732 #13

p. 415 #6, p. 457 #20, p. 546 #10, p. 642 #17, p. 731 #7

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In function questions, if you see $f(4) = m$, whatever is next to the "f" is always the x value.

Therefore, you would plug in 4 for x and solve for y or go over 4 on the x-axis and see what the y-value is when you hit the graph.

If you see $f(m) = 4$, then you know the y-value is 4 and you look to see what x values would give you a y value of 4.

A rule with triangles- 2 sides of a triangle must add up to be more than the third side.

Here are a few words that have mathematical equivalents:

<u>Phrase or word</u>	<u>Math symbol</u>
sum, more than	+
difference, less than	-
product, times	x
of	x
quotient, ratio	÷
is	=
"a number"	(x, b, m)

When you see any of these words, try to take the word sentence in the question and turn it into a math equation.

p. 454 #6, p. 457 #19, p. 466 #9, p. 468 #17, p. 482 #4, p. 529 #14, p. 543 #1, p. 582 #6, p. 613 #14, p. 651 #4, p. 651 #5, p. 655 #16, p. 670 #12, p. 714 #7, p. 716 #13, p. 730 #3, p. 771 #10, p. 786 #3, p. 787 #9, p. 796 #3, p. 797 #9, p. 797 #10, p. 834 #13, p. 889 #10, p. 891 #17, p. 907 #17, p. 952 #14, p. 966 #4, p. 977 #2

When a question tells you that you want the greatest possible value for a number, you need to make the other values as small as possible!

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Whenever there is a shape that is not a basic circle, square, rectangle, or triangle, try to split the shape up into these basic pieces. Also, on shaded area question, you never have to know the formula for the area of a strange shape. Get the area of a couple of simple shapes and subtract

p. 400 #17, p. 414 #5, p. 518 #17, p. 703 #16, p. 773 #16, p. 835 #16, p. 852 #20

If you double a number, you are increasing it by 100 %. If you divide a number in half, you are decreasing it by 50 %.

Ex. If you go from producing 4 cars per day to 8 cars per day, what is your percentage increase? (increase of 100 %)

Ex. If you go from producing 8 cars per day to 4 cars per day, what is your percentage decrease? (decrease of 50 %)

" $f(x) + 2$ " means shift the graph up 2.

" $f(x) - 2$ " means shift down 2.

" $f(x + 2)$ " means shift LEFT 2.

" $f(x - 2)$ " means shift RIGHT 2.

Know the rule that as a fraction goes to a higher power, the fraction actually gets smaller. Know the rule that when you are working with an x^2 question, there is a positive value and a negative value. Make sure to remember that as a negative number gets larger, its value gets smaller. For example, -4 is larger than -7.

p. 454 #9, p. 464 #5, p. 516 #8, p. 655 #15, p. 670 #14,
p. 701 #7, p. 702 #8, p. 703 #13, p. 732 #14, p. 830 #1,
p. 859 #8, p. 860 #10, p. 890 #13, p. 916 #6

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In absolute value questions, the rule that works every time is:

$$|h - (\text{middle of the range})| < (\frac{1}{2} \text{ of the range})$$

- “h” stands for the variable in the question

p. 400 #15, p. 418 #15, p. 456 #17, p. 467 #14, p. 529 #13, p. 545 #7, p. 653 #10, p. 669 #9, p. 701 #6, p. 797 #8, p. 860 #10, p. 917 #9, p. 949 #4

When numbers are in a set, you don't count them twice if they are repeated.

Know how to get the Surface Area of a Rectangular Box: You find the area of each of the six sides and then you add the six areas together.

p. 423 #11

If something is definitely going to happen, the probability is 1 or 100%.

If something is definitely not going to happen, the probability is 0 or 0 %.

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