

SAT MATH SHORTCUTS

Here's a notes sheet outlining some common shortcuts and patterns frequently seen in the SAT Math section:

- **Divisibility Rules:**
 - Divisible by 2: The last digit is even (0, 2, 4, 6, 8).
 - Divisible by 3: The sum of the digits is divisible by 3.
 - Divisible by 4: The last two digits form a number divisible by 4.
 - Divisible by 5: The last digit is 0 or 5.
 - Divisible by 6: The number is divisible by both 2 and 3.
 - Divisible by 9: The sum of the digits is divisible by 9.
- **Squares and Square Roots:**
 - Squaring a number ending in 5: Take the first digit, multiply it by the next consecutive digit, and add 25 at the end.
 - Squaring numbers close to 100: Use the identity $(a + b)^2 = a^2 + 2ab + b^2$.
 - Estimating square roots: Find the perfect square closest to the given number, and estimate the square root accordingly.
- **Algebraic Manipulations:**
 - Difference of squares: $a^2 - b^2 = (a + b)(a - b)$.
 - FOIL method: $(a + b)(c + d) = ac + ad + bc + bd$.
 - Factoring quadratics: $ax^2 + bx + c = (px + q)(rx + s)$, where $p, q, r,$ and s are integers that satisfy $pr = a, qs = c,$ and $ps + qr = b$.
- **Triangles:**
 - Special right triangles: 45-45-90 triangle (sides are in the ratio $1:1:\sqrt{2}$), 30-60-90 triangle (sides are in the ratio $1:\sqrt{3}:2$).
 - Pythagorean triplets: Common triplets are (3, 4, 5), (5, 12, 13), (8, 15, 17), (7, 24, 25).
- **Ratios and Proportions:**
 - Direct and inverse proportions: If two quantities are directly proportional, when one increases, the other increases by the same factor. If two quantities are inversely proportional, their product remains constant.
 - Unitary method: Solve proportion problems by considering the relationship between the given quantities.



- Arithmetic Operations:
 - Multiplying by powers of 10: Shift the decimal point to the right by the number of zeros in the power of 10.
 - Adding or subtracting fractions: Find a common denominator and perform the operation on the numerators.
 - Distributive property: $a(b + c) = ab + ac$.

Remember, these shortcuts and patterns are meant to help you save time and simplify calculations. Practice using them in SAT-style questions to familiarize yourself and increase your efficiency in the SAT Math section.

— **Maryam Farooqi, founder of Rise4Education**

