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Indeterminate Equation

The Inequality (Squeeze) Method



Learn how to solve this *type* of problems, not just this problem.

- 1. Solve this equation in integers: $y^2 = x^2 + x + 1$.
- 2. Solve in integers the equation $y^2 = x^4 + x^3 + x^2 + x + 1$. (Ref Ref 2081)
- 3. Solve in integers the equation

$$\frac{1}{x} + \frac{1}{y} + \frac{1}{z} = \frac{3}{5}$$

(Ref Ref 2084: Romania Olympiad)

4. Solve in positive integers the equation

$$3(xy + yz + zx) = 4xyz$$

(Ref Ref 2243: Putname)

5. A rectangular box measures $a \times b \times c$, where a, b, and c are integers and $1 \le a \le b \le c$. The volume and the surface area of the box are numerically equal. How many ordered triples (a, b, c) are possible? (Ref Ref 401: 2015 AMC12B #23)

6. Solve in integers the equation

$$(x+y)^2 = x^3 + y^3$$

(Ref Ref 2359)

- 7. How many ordered triples of integers (a, b, c), with $a \ge 2, b \ge 1$, and $c \ge 0$, satisfy both $\log_a b = c^{2005}$ and a + b + c = 2005? (Ref Ref 914: 2005 AMC12A #21)
- 8. Find all integers a, b, c with 1 < a < b < c such that the number (a-1)(b-1)(c-1) is a divisor of abc - 1. (Ref Ref 2240: 1992 IMO)
- 9. Find all positive integers n and k_i $(1 \le i \le n)$ such that

$$k_1 + k_2 + \dots + k_n = 5n - 4$$

and

$$\frac{1}{k_1} + \frac{1}{k_2} + \dots + \frac{1}{k_n} = 1$$

(Ref Ref 2242: Putnam)

10. Solve in positive integers $(1+\frac{1}{x})(1+\frac{1}{y})(1+\frac{1}{z})=2$ (Ref Ref 2241: UK Olympiad)

Page: 1

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