

Problem Set #6

(BAD) 1. Factor the following: $a^5(c - b) + b^5(a - c) + c^5(b - a)$ and $(x + y)^7 - (x^7 + y^7)$

(GOOD) 2. In which integral bases is 1367631 a perfect cube?

(BAD) 3. Find a value for x^2 such that $\sqrt[3]{1 - x^3} + \sqrt[3]{1 + x^3} = 1$

(Good) 4. Find $x - y$, given that $x^4 = y^4 + 24$, $x^2 + y^2 = 6$, and $x + y = 3$.

(Good) 5. Aliens from Lumix have one head and four legs, while those from Obscra have two heads and only one leg. If 60 aliens attend a joint Lumix and Obscra interworld conference, there are 129 legs present. How many heads are present?

(Same Ole) 6. What is the absolute value of the difference of the numerator and denominator in the reduced fractional equivalent of the decimal 0.9200720072007 ...

(Good) 7. Car A is traveling at 20 miles per hour. Car B is 1 mile behind following at 30 miles per hour. A fast fly can move at 40 miles per hour. The fly begins on the front bumper of car B and flies back and forth between the two cars. How many miles will the fly travel before it is crushed in the collision?

(Good) 8. The lengths of the sides of a triangle are integers and the area is also an integer. One side is 21 and the perimeter is 48. What is the shortest side? (Note: Heron's Formula for the area of a triangle is useful).

(Good) 9. Both roots of the quadratic equation, $x^2 - 63x + k$ are primes. How many possible values does k have?

(Good) 10. What is the product of the A and B which satisfy:

$$\frac{35x - 29}{x^2 - 3x + 2} = \frac{A}{x - 1} + \frac{B}{x - 2}$$