

Bergen County Math League

Calculators Permitted

Good Luck to You



Good Luck to All

Contest #5

2024-2025 12 minutes

Questions 1 & 2

5-1. Let $x = 2^7 \cdot 3^4 \cdot 5 \cdot 7^2 \cdot 11^3$. How many perfect squares are factors of x ?

5-2. In *right* $\triangle ABC$, $m\angle C = 90$. If \overline{CD} is the altitude of \overline{AB} and $DB = 3AD$, find $m\angle DCB$.

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Questions 3 & 4

- 5-3. The function f is defined on the integers so that, for every integer n greater than 1, $f(n) = f(a) + f(b)$ for at least one pair of positive integers (a, b) for which $a + b = n$. If $f(1) = 2$, find the value of $f(1000)$.
- 5-4. Square $ABCD$ has a side 12 cm long. A circle is drawn which passes through each of the trisection points of each of the sides of square $ABCD$. The area of this circle is $k\pi$ square cm. Find k .

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Questions 5 & 6

5-5. Express $4^8 - 1$ as a base-four numeral.

5-6. What is the degree measure of the angle formed by the minute hand and the hour hand of a clock when the time is 8:43:37? Express your answer as a fraction in lowest terms.