

Bergen County Math League

NO Calculators Permitted

Good Luck to You



Good Luck to All

Contest #2

2024-2025 12 minutes

Questions 1 & 2

2-1. Find the ordered pair (x, y) for which $2^x = 4y$ and $2(3^x) = 27y$.

2-2. If the length of \overline{AB} is 10 cm, find the number of square cm in the area of the planar region bounded by the locus of points 3 cm from \overline{AB} . Give an exact answer.

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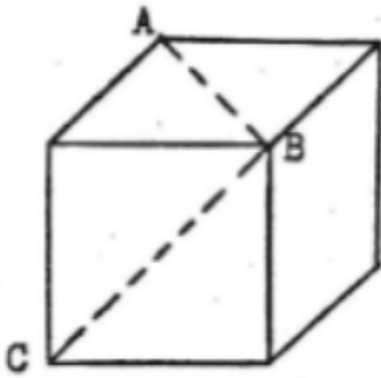
2024-2025

12 minutes

Questions 3 & 4

2-3. Find the ordered pair (a, b) for which $x^3 + 7x^2 + ax + b$ is divisible by $x^2 + 1$.

2-4. The accompanying picture represents a cube, three of whose vertices are $A, B,$ and $C,$ as pictured. What is the degree measure of $\angle ABC$?



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Questions 5 & 6

- 2-5. Mrs. Smith has three sons: Stan, Steve and Stu. One is skiing in Seldon, a second is in Setauket, and the third is in Smithtown. One is skating, one is skiing, and one is skeet-shooting. Stan is not in Seldon, Stu is not in Setauket, and the son who skeet-shoots is not in Smithtown. If the skiing enthusiast is not Stu, who is skeet-shooting and where is he skeet shooting? Express your answer as an ordered pair (who, where).
- 2-6. In what positive base n is it true that 806_n is 260% as large as 316_n ?