



Contest #6

Bergen County Math League

2019–2020

Part I *Time Limit:* 12 minutes

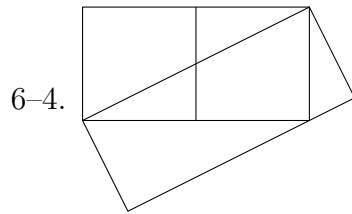
No Calculators

- 6–1. Factor $24x^2 + 49x - 40$ into two binomials with integer coefficients.
- 6–2. Find $f(x)$ if $2f(x) + f(1 - x) = x^2$ for all x .
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Part II *Time Limit:* 12 minutes

No Calculators

- 6–3. Equilateral triangle $\triangle ABC$ has sides of length 12. Region R contains all interior points of the triangle (and only those points) which are nearer to \overline{AC} than to either \overline{AB} or \overline{BC} . Find the area of region R .



The two squares in the diagram have side length 1. Find the area of the slanted rectangle.

Part III *Time Limit:* 12 minutes

No Calculators

- 6–5. Joe Poorstudent believes that the equation $\log_3(x + y) = \log_3 x + \log_3 y$ is true. Find the only ordered pair of positive integers (x, y) for which Joe is correct.
- 6–6. Find the sum of the infinite series whose n^{th} term is $\frac{n}{3^n}$.
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