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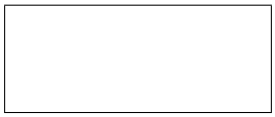
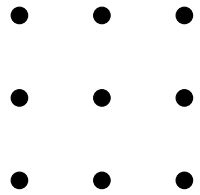


Problem 2. What is the maximum number of dots you can choose from a 3 by 3 grid of dots, if no 3 of the chosen dots can be in the same row, the same column, or the same diagonal?



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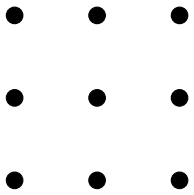

Problem 3. Find $\displaystyle\sum_{p=1}^{\infty}\left(\sum_{q=1}^{\infty}\left(\frac{1}{3}\right)^{q}\right)^{p}$.

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Problem 4. How many 1s are in the base 2 expansion of the number whose base 8 expansion is 2017?

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Problem 5. How many ordered pairs of positive integers (x, y) satisfy $x + y \leq 100$?

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Problem 6. What is the largest number of lines you can draw through $(0, 0)$ in the xy-plane with the property that the angle between any two of them is the same?

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Problem 7. How many of the coefficients of $(2x+\frac{1}{2}y)^8$ are integers, after simplifying?

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Problem 8. What is the length of the shortest path in the xy-plane that starts at $(1, 1)$, touches the x-axis, and ends at $(2, 2)$?

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Problem 9. If x and y are positive integers satisfying $\ln(x+y) = \ln(x) + \ln(y)$, what is $x^2 + y^2$?

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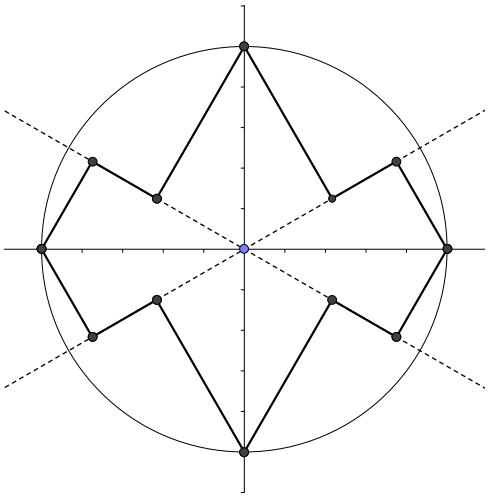
Problem 10. Start with a circle of radius 1 centered at $(0, 0)$. Draw two lines making an angle of $30°$ with the x-axis. Drop perpendiculars from these lines to the points $(\pm 1, 0)$ and $(0, \pm 1)$. Join the perpendiculars along the $30°$ lines to form a closed polygon.

What is the perimeter of this polygon?



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