

Nassau County Interscholastic Mathematics League

Contest # 5

Answers must be in simplest exact form, unless otherwise noted.

2004-2005

No Calculators

Problems 19-20 Time limit: 10 minutes.

19) At Wassamata U., there are 430 students. There are 385 students taking math, 240 taking science, and 210 taking both math and science. If one student (Rocky) is randomly picked, find the probability that Rocky takes neither math nor science. Write your answer as a simplified, common fraction.

20) If the vertices of a triangle are at $(1,4)$, $(2,7)$ and $(9,-2)$, find the coordinates of the point of intersection of the medians of the triangle.

Problems 21-22 Time limit: 10 minutes.

21) . A circle contains two vertices of a square and is tangent to the opposite side. If each side of the square has length 10, find the radius of the circle. Write your answer as a simplified, common fraction.

22) Write in simplest form, the equations of all lines which are asymptotes of the graph of

$$y = \frac{(2x+1)^3(3x-4)^2(x+1)^2}{(2x+1)(3x-4)^5(x+1)}.$$

Problems 23-24 Time limit: 10 minutes.

23) . Find the exact area of the region in the plane bounded by the graphs of $x^2 + y^2 \leq 36$, $y \geq 0$, and $y \leq \frac{-\sqrt{3}}{2}x$.

24) Find all ordered pairs of positive integers (x,y) such that $5x + 7y = 92$.

Answers: 19) $\frac{3}{86}$

20) $(4,3)$

21) $\frac{25}{4}$

22) $x = \frac{4}{3}$, $y = \frac{4}{27}$

23) 6π

24) $(17,1), (10,6), (3,11)$