

Nassau County Interscholastic Mathematics League

Contest #3

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

2004-2005

No Calculators

Problems 13-14 Time limit: 10 minutes.

- 13) Moe knows that one of three people made a prank phone call. Each of them gives two statements. The “guilty” party made one true and one false statement. The innocent persons made two false statements. They said:
Amanda: (1) If Hugg is guilty, then Kiss is guilty. (2) Hugg and Kiss are guilty
Hugg: (1) Amanda’s statements are both true. (2) Amanda or Kiss are innocent.
Kiss: (1) Amanda and Hugg are both guilty. (2) Hugg is innocent or Amanda is guilty.

Of Amanda, Hugg, and Kiss, which one or two are guilty?

14) . Evaluate the product $\frac{2^2 - 1}{2^2 + 2} \cdot \frac{3^2 - 1}{3^2 + 3} \cdot \frac{4^2 - 1}{4^2 + 4} \cdots \frac{19^2 - 1}{19^2 + 19} \cdot \frac{20^2 - 1}{20^2 + 20}$.

Problems 15-16 Time limit: 10 minutes.

15. Find the exact distance between the parallel lines $y = 2x + 11$ and $y = 2x - 14$. State your answer in simplified radical form.
16. The vertices of a triangle are $A(1,3)$, $B(4,7)$, and $C(8,-2)$. Find, in slope-intercept form, the equation of the line containing the altitude from C to side \overline{AB} .
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Problems 17-18 Time limit: 10 minutes.

17. Solve for z over the set of complex numbers: $z^2 + iz + 6 = 0$. Solve for z over the set of complex numbers, where i is the imaginary unit, $\sqrt{-1}$.
18. $ABED$ is a quadrilateral and point C is on \overline{BE} . $ABCD$ is a parallelogram. $\triangle CED$ is equilateral. $AB = BC = 6$. Find the area of $ABED$.
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Answers:	13)	Hugg	14)	$\frac{1}{20}$
	15)	$5\sqrt{5}$	16)	$y = \frac{-3}{4}x + 4$
	17)	$2i, -3i$	18)	$27\sqrt{3}$