

No Calculators

Problems 13-14 Time limit: 10 minutes.

13) Find the following quotient of base two numbers and write your answer as a

base two number: $\frac{1110101}{1101}$.

14) Exactly one of Polly, Tom, Huck, or Jim has whitewashed the fence. Each made two statements, one of which is true and the other false, as follows:

Polly: (1) If Tom did it, then Huck did not; (2) Huck did it or Jim did it.

Tom: (1) I didn't do it; (2) Polly didn't do it or I didn't do it.

Huck: (1) I didn't do it; (2) If Polly didn't, then Jim did.

Jim: (1) I did it; (2) I did not do it.

Who did it?

Problems 15-16 Time limit: 10 minutes.

15. Find the exact area of an equilateral triangle inscribed in the circle with equation $x^2 + y^2 = 12$.

16. Three red marbles, five black marbles, and seven yellow marbles are in a bag. Two distinct marbles are randomly chosen without replacement. Find the probability that they are different colors.

Problems 17-18 Time limit: 10 minutes.

17. Define a "mid-diagonal" to be a segment connecting a midpoint of one side of a polygon to a vertex of the polygon (other than the endpoints of the side containing that midpoint). Find the number of mid-diagonals of an octagon.

18. A ladder is resting against a wall (top and base both touching the wall, base on the floor). If the base is moved 4 feet from the wall, it moves the top of the ladder down the wall by one-fourth the length of the ladder. How long (in exact number of feet) is the ladder?

Answers:	13)	1001	14)	Tom
	15)	$9\sqrt{3}$	16)	$\frac{71}{105}$
	17)	48	18)	$\frac{16\sqrt{7}}{7}$