

1. Write your solutions on separate pieces of paper.
2. Write your name, your address, name of your school, and the school teacher at the top of each piece of paper you turn in.
3. When solving a problem explain your solution (even if you can only explain part of it, or have only part of a solution). Answers without explanations will receive no credit.

## MANHATTAN MATHEMATICAL OLYMPIAD 2008

### Grades 9-12

1. All trees in the forest have different heights and are taller than 10ft and shorter than 50 ft. It is known that the distance between any two trees does not exceed the difference of their heights. Prove that the forest can be surrounded by a fence 80ft long.

2. Recall that the symbol  $n!$  means the product  $1 \cdot 2 \cdot 3 \cdot \dots \cdot n$ . Simplify

$$\frac{1}{2!} + \frac{2}{3!} + \frac{3}{4!} + \dots + \frac{2007}{2008!}.$$

3. Find last two digits of the number  $14^{14^{14}}$  (we raise 14 to the power  $14^{14}$ ).

4. Solve the equation

$$x^2/3 + 48/x^2 = 10(x/3 - 4/x).$$