

Name _____ ID#: _____ Serial #: _____

Instructions. The quiz is 20 minutes. Write **important steps** to arrive at the solution of the following problems.

1. (6 marks) Expand $(5x^2 + y)^3$.

2. (7 marks) Show that, for $n > 0$

$$\sum_{i=0}^n (-1)^{n-i} \binom{n}{i} = 0.$$

Hint: Use the binomial theorem.

3. (7 marks) In a certain community, 3 families consisting of a single parent and 2 children, 5 families consisting of 2 parents and a single child, 7 families consisting of 2 parents and 2 children, and 6 families consisting of 2 parents and 3 children. If a parent and child from the same family are to be chosen, how many possible choices are there?