

October 2008 Questions

- 1) The factorial $x!$ is defined for a positive integer x by the following

$$x! = x(x-1)(x-2)\cdots(3)(2)(1)$$

For example, $4! = (4)(3)(2)(1) = 24$.

- (a) If $m \geq 3$, show that 3 does not divide $m! - 2$.
(b) Find all possible values of m, n such that $n! + 1 = (m! - 1)^2$.
- 2) In the federal election, the ratio of male to female voters was $a : b$. Had c fewer men and d fewer women voted, the ratio would have been $e : f$. In terms of a, b, c, d, e , and f , determine the total number of votes cast.

Submit all solutions by 23.59 October 31, 2008.