m3pm16cw(14).tex

M3PM16/M4PM16 ASSESSED COURSEWORK. 21.3.2014

Friday 7 March; deadline 12 noon, Friday 21 March

Q1. Show that

$$\prod_{p \le n} p \le 4^n.$$

(You may find it helpful to use induction on n, and when n = 2m + 1, to consider $\binom{2m+1}{m}$, as in Chebyshev's estimates.)

Q2. Assuming the Prime Number Theorem, show that for all $\epsilon > 0$ there exists $N(\epsilon)$ such that

$$\prod_{p \le n} p \le e^{(1+\epsilon)n} \qquad (n \ge N(\epsilon)).$$

NHB