lower bound for $x$ in Fermat's equation.

Let $n > 2$ be integral and let $0 < x < y < z$ be integers such that $x^n + y^n = z^n$.

Then $x^n = z^n - y^n \geq (y + 1)^n - y^n$

$= ny^{n-1} + \frac{n(n-1)}{2} y^{n-2} + \ldots$

But $y > 2n$ is known (Australian result).

So $x^n > ny^{n-1} - \frac{n^2}{2} y^{n-2}$

$> y^{n-2} x (y - \frac{n}{2})$

$> a y^{n-2} n (2n - \frac{n}{2})$

$= 3 x 2^{(n-3)} n$

$x > \frac{2n}{\sqrt[3]{8/3}}$

better than $x > n$. 