The Last Theorem of Pierre de Fermat. A short and Simple Proof.

Of course Mr. Pierre de Fermat did not know the ABC hypothesis, let alone hypothesis Taniyama-Shimura. He simply wrote that there is no solution in integers $x^n + y^n = z^n$ if n $\succ 2$
He understood the essence of the proof, but did not even begin to uncover it, assuming it is elementary.

Perhaps like this:

Option 1

$$x^n + y^n = z^n \quad (x, y, z, n \in N),$$

a) $\sqrt{x^n} = \sqrt{z^n - y^n}$ if $n \succ 2 \Rightarrow \sqrt{x^n} = x\sqrt{x^{n-2}}$

$\sqrt{y^n} = \sqrt{z^n - x^n}$ if $n \succ 2 \Rightarrow \sqrt{y^n} = y\sqrt{y^{n-2}}$

$\sqrt{z^n} = \sqrt{y^n + x^n}$ if $n \succ 2 \Rightarrow \sqrt{z^n} = z\sqrt{z^{n-2}}$

b) $\dfrac{x\sqrt{x^{n-2}}}{y\sqrt{y^{n-2}}} = \dfrac{\sqrt{z^n - y^n}}{\sqrt{z^n - x^n}} \Rightarrow \dfrac{x}{y} = \dfrac{\sqrt{y^{n-2}}\sqrt{z^n - y^n}}{\sqrt{x^{n-2}}\sqrt{z^n - x^n}}$

$\dfrac{z\sqrt{z^{n-2}}}{y\sqrt{y^{n-2}}} = \dfrac{\sqrt{x^n + y^n}}{\sqrt{z^n - x^n}} \Rightarrow \dfrac{z}{y} = \dfrac{\sqrt{y^{n-2}}\sqrt{x^n + y^n}}{\sqrt{z^{n-2}}\sqrt{z^n - x^n}}$

c) kx= $\sqrt{y^{n-2}}\ \sqrt{z^n - y^n} \Rightarrow$ k= $\dfrac{\sqrt{y^{n-2}}\sqrt{z^n - y^n}}{x}$

ky= $\sqrt{x^{n-2}}\ \sqrt{z^n - x^n} \Rightarrow$ k= $\dfrac{\sqrt{x^{n-2}}\sqrt{z^n - x^n}}{y} = \dfrac{\sqrt{y^{n-2}}\sqrt{z^n - y^n}}{x}$

$k \neq K$

$\Rightarrow$ ***K***y=x $\Rightarrow K = \dfrac{x}{y}, but (x, y) = 1 \Rightarrow K \notin N \Rightarrow K = 1 \Rightarrow x = y$,but $x \neq y$

K$=1 \Rightarrow \sqrt{y^{n-2}}\ \sqrt{z^n - y^n} = \sqrt{x^{n-2}}\ \sqrt{z^n - x^n} \Rightarrow y^{n-2}x^n = x^{n-2}y^n \Rightarrow \dfrac{y^n x^n}{y^2} = \dfrac{x^n y^n}{x^2}$

$\Rightarrow x = y$ **but** $x \neq y$

Q.E.D.

Option 2

$$x^n + y^n = z^n$$

a) $\sqrt{x^n} = \sqrt{z^n - y^n}$ if $n \succ 2 \Rightarrow \sqrt{x^n} = x\sqrt{x^{n-2}}$

$\sqrt{y^n} = \sqrt{z^n - x^n}$ if $n \succ 2 \Rightarrow \sqrt{y^n} = y\sqrt{y^{n-2}}$

$\sqrt{z^n}$ = $\sqrt{x^n + y^n}$ if $n \succ 2 \Rightarrow \sqrt{z^n} = z\sqrt{z^{n-2}}$

b) $\dfrac{x\sqrt{x^{n-2}}}{y\sqrt{y^{n-2}}} = \dfrac{\sqrt{z^n - y^n}}{\sqrt{z^n - x^n}} \Rightarrow \dfrac{x}{y} = \dfrac{\sqrt{y^{n-2}}\sqrt{z^n - y^n}}{\sqrt{x^{n-2}}\sqrt{z^n - x^n}}$

c) $\dfrac{x\sqrt{x^{n-2}}}{z\sqrt{z^{n-2}}} = \dfrac{\sqrt{z^n - y^n}}{\sqrt{y^n + x^n}} \Rightarrow \dfrac{x}{z} = \dfrac{\sqrt{z^{n-2}}\sqrt{z^n - y^n}}{\sqrt{x^{n-2}}\sqrt{y^n + x^n}}$

d) $(\sqrt{z^n})^2 = (\sqrt{x^n})^2 + (\sqrt{y^n})^2 \Rightarrow \dfrac{\sqrt{x^n}}{\sqrt{z^n}} = \cos\beta$

$$\frac{x}{z} = \frac{\sqrt{z^{n-2}}\sqrt{z^n - y^n}}{\sqrt{x^{n-2}}\sqrt{y^n + x^n}} = \frac{\sqrt{z^{n-2}}}{\sqrt{x^{n-2}}}\cos\beta \Rightarrow$$

$$kz = \sqrt{x^{n-2}}, \Rightarrow k = \frac{\sqrt{x^{n-2}}}{z}, (x,z) = 1 \Rightarrow k \notin N \Rightarrow z = \sqrt{x^{n-2}}, but (x,z) = 1 \Rightarrow Q.E.D.$$

and:

$$kx = \sqrt{z^{n-2}}\cos\beta \Rightarrow k = \frac{\sqrt{z^{n-2}}\sqrt{x^n}}{x\sqrt{z^n}} \Rightarrow \frac{\sqrt{x^{x-2}}}{z} = \frac{\sqrt{z^{n-2}}\sqrt{x^n}}{x\sqrt{z^n}}, \sqrt{x^{n-2}} \prec \sqrt{z^{n-2}}\sqrt{x^n} \Rightarrow$$

$k \neq K$

$$\sqrt{z^{n-2}}\sqrt{x^n} = K\sqrt{x^{n-2}} \Rightarrow K = \frac{\sqrt{z^{n-2}}\sqrt{x^n}}{\sqrt{x^{n-2}}} = \frac{\sqrt{z^{n-2}}}{x} \notin N \Rightarrow K = 1$$

but

$(x,z) = 1 \Rightarrow Q.E.D.$

and:

$$x\sqrt{z^n} = Kz \Rightarrow K = \frac{x\sqrt{z^n}}{z} \Rightarrow \frac{x\sqrt{z^n}}{z} = \frac{\sqrt{z^{n-2}}}{x} \Rightarrow x^2\sqrt{z^{n-2}} = \sqrt{z^{n-2}} \Rightarrow x^2 = 1$$

but

$x \succ 1 \Rightarrow K = 1$

AND:

If $K = 1 \Rightarrow \sqrt{z^{n-2}}\sqrt{x^n} = \sqrt{x^{n-2}} \Rightarrow \dfrac{\sqrt{z^n}}{z} = \dfrac{\sqrt{x^{n-2}}}{\sqrt{x^n}} \prec 1 \Rightarrow \dfrac{\sqrt{z^n}}{z} \prec 1,$

But $n \succ 2$

Q.E.D.

I am convinced that there can be still be many ways found how to define the relationship between x, y and z, proving that Mr. Fermat is correct.

Also Andrew Beal's hypothesis cannot be forgotten, his genius statement cannot be left without awe. How he managed to do it I cannot comprehend – beautifully and with elegance! This proof confirms that Andrew Beal's hypothesis is true.

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