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A\quad proof\quad of\quad Fermat's\quad Last\quad Theorem\\ \\ BY\quad
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This\quad proof\quad is\quad based\quad on\quad an\quad
assumption\quad that\quad value\quad of\quad an\\ infinite\quad
series\quad can\quad not\quad be\quad obtained\quad from\quad
finite\quad number\quad of\quad terms\quad of\\ the\quad
series.For\quad all\quad possible\quad factors\quad of\quad (x+y-z)
\quad which\quad are\quad not\quad factors\\ of\quad x\quad or\quad
y\quad or\quad z\quad ,\quad three\quad infinite\quad series\quad
can\quad be\quad developed\quad ,\quad two\quad convergent\\ and\quad
one\quad divergent.\quad In\quad all\quad the\quad three\quad
cases\quad the\quad value\quad of\quad the\quad infinite\\ series\quad
can\quad be\quad obtained\quad by\quad considering\quad only\quad
a\quad finite\quad number\quad of\quad terms.\quad \\ This\quad
gives\quad the\quad value\quad for\quad (x+y-z)\quad =\quad { p }
^{ \alpha  }\quad { p }_{ 1 }\quad { p }_{ 2 }\quad { p }_{ 3 }\quad
thus\quad prooving\\ Fermat's\quad last\quad theorem.\\ \\ Proof:-\\
If\quad { x }^{ p }\quad +\quad { y }^{ p }\quad =\quad { z }
^{ p\quad  }where\quad 'p'\quad is\quad a\quad prime\quad number\quad
has\quad solution\quad in\quad integers\quad it\\ is\quad well\quad
known\quad that\quad integers\quad { p }_{ 1 },{ p }_{ 2 },{ p }
_{ 3 },{ q }_{ 1 },{ q }_{ 2 },{ q }_{ 3 }\quad and\quad \alpha \quad
exists\quad such\quad that\quad \\ x={ p }_{ 1 }{ q }_{ 1 }\quad
y={ p }_{ 2 }{ q }_{ 2 }\quad z={ p }_{ 3 }{ q }_{ 3 }\quad and\quad
z-y={ ({ p }_{ 1 }) }^{ p }\quad z-x={ ({ p }_{ 2 }) }^{ p }\quad
x+y={ ({ { p }_{ 3 } }) }^{ p }\quad if\quad p\quad is\quad prime\quad
to\quad x,y,z\\ and\quad if\quad p\quad is\quad a\quad divisor\quad
of\quad one\quad of\quad them\quad say\quad z\quad then\quad z={ p }
^{ \alpha  }{ p }_{ 3 }{ q }_{ 3 };\quad x+y={ p }^{ p\alpha -1 }
{ ({ p }_{ 3 } })^{ p\quad  }.\\ x+y-z\quad \equiv \quad 0\quad
mod({ p }_{ 1 }{ p }_{ 2 }{ p }_{ 3\quad  })\quad is\quad
obvious.It\quad is\quad easy\quad to\quad proove\quad that\quad { q }
_{ 1 }\equiv { q }_{ 2\quad  }\equiv { q }_{ 3 }\equiv 1mod({ p }
^{ 2 })\\ and\quad \therefore \quad x+y-z\quad \equiv \quad 0\quad
mod({ p }^{ 3 })\\ thus\quad x+y-z\quad \equiv \quad 0\quad mod({ p }
^{ \alpha  }{ p }_{ 1 }{ p }_{ 2 }{ p }_{ 3 })\quad and\quad \alpha
\ge 3.Further\quad HCF\quad of\quad ({ x }^{ 2 }+xy+{ y }^{ 2 }),\\
({ z }^{ 2 }-zx+{ x }^{ 2 }),({ z }^{ 2 }-zy+{ y }^{ 2 })\quad is\quad
{ p }_{ 4 }\quad then\quad x+y-z\quad \equiv \quad 0\quad mod({ p }
_{ 4\quad  })\quad if\quad p\quad \equiv \quad 5\quad mod(6)\quad and\
\ x+y-z\quad \equiv \quad 0\quad mod({ p }_{ 4 }^{ 2 })\quad if\quad
p\quad \equiv \quad 1\quad mod(6).\quad In\quad addition\quad \\ x+y-
z\quad and\quad \frac { { (x+y) }^{ 2 }-{ x }^{ 2 }-{ y }^{ 2 } }
{ xy(x+y)({ x }^{ 2 }+xy+{ y }^{ 2 }) } \quad or\quad \frac
{ { (x+y) }^{ 2 }-{ x }^{ 2 }-{ y }^{ 2 } }{ xy(x+y){ ({ x }^{ 2 }+xy+
{ y }^{ 2 }) }^{ 2 } } \quad can\quad have\quad a\quad common\quad
factor\\ say\quad { p }_{ 5 }.\quad \because \quad it\quad can\quad
be\quad concluded\quad that\quad x+y-z\quad =\quad { p }^{ \alpha  }
{ p }_{ 1 }{ p }_{ 2 }{ p }_{ 3 }{ p }_{ 4 }^{ l }{ p }_{ 5 }\quad
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where\quad l=1or\quad 2.\\ \\ Let\quad us\quad assume\quad that\quad
'p'\quad is\quad prime\quad to\quad x,y,z.\\ z\quad \equiv \quad
x+y\quad mod\quad ({ p }^{ \alpha })----So\quad we\quad can\quad
take\quad \\ z\quad =\quad (x+y)+{ k }_{ 1 }{ p }^{ \alpha }\quad ;
\quad \therefore \quad { z }^{ p }\quad \equiv \quad { (x+y) }^{ p }
+p{ (x+y) }^{ p-1 }{ k }_{ 1 }{ p }^{ \alpha }\quad mod({ p }
^{ 2\alpha +1 })\quad ----(1)\\ from\quad (1)\quad { k }_{ 1 }{ p }
^{ \alpha }\quad \equiv \quad \frac { 1 }{ p } .\frac { { x }^{ p }+
{ y }^{ p }-{ (x+y) }^{ p } }{ { (x+y) }^{ p-1 } } mod\quad ({ p }
^{ 2\alpha +1 })------------(2)\\ this\quad can\quad be\quad
continued\quad further\quad { k }_{ 2 }{ p }^{ 2\alpha },\quad { k }
_{ 3 }{ p }^{ 3\alpha },\quad { k }_{ 4 }{ p }^{ 4\alpha },-----,
{ k }_{ r }{ p }^{ \beta },----up\quad to\quad \infty \\ \\ Let\quad
Q\quad =\quad \frac { { x }^{ p }+{ y }^{ p }-{ (x+y) }^{ p } }
{ p{ (x+y) }^{ p } } \quad \equiv \quad 0\quad mod({ p }^{ \alpha })
\quad and\quad \ncong \quad 0\quad mod({ p }^{ \alpha +1 })\quad
\because \quad x+y-z\quad \equiv \quad 0\quad mod({ p }^{ \alpha })-
(3)\\ \frac { 1 }{ p } { C }_{ r }\quad =\quad { p }^{ r-1 }\quad
\frac { 1 }{ r! } \quad (1-p)(1-2p)(1-3p)------(1-rp+1)\quad --------
(4)\\ then\quad { k }_{ r }{ p }^{ \beta }\quad \equiv \quad \frac
{ 1 }{ p } { C }_{ r }\quad { Q }^{ r }(x+y)\quad mod({ p }^{ \beta +
\alpha })\quad where\quad if\quad (r+1)!\quad \equiv \quad 0\quad
mod({ p }^{ \gamma })\quad then\\ \beta +\alpha \quad =\frac
{ (r+1)\alpha }{ \gamma } \quad \quad ----------(5)\quad \quad
\therefore \quad \\ z\quad \equiv \quad (x+y)\quad +\quad (x+y)\quad
\sum _{ 1 }^{ r }{ \frac { 1 }{ p } { C }_{ r } } \quad { Q }^{ r }
\quad mod({ p }^{ \beta +\alpha })\quad -------(6)\\ Basically\quad
eqn\quad (6)\quad is\quad the\quad expantion\quad of\quad \frac { z }
{ x+y } \quad =\quad { \{ \quad 1+\frac { { x }^{ p }+{ y }^{ p }_
{ (x+y) }^{ p } }{ { (x+y) }^{ p } } \quad \} }^{ \frac { 1 }{ p } }
\\ Now\quad if\quad z\quad \equiv \quad { z }_{ r }\quad mod({ P }
^{ \beta +\alpha })\quad and\quad Where\quad { z }_{ r }\quad <\quad
{ p }^{ \beta +\alpha }\quad the\quad eqn\quad (6)\quad will\quad
generate\quad an\quad infinite\\ sequence\quad \quad { z }_{ 1 },\quad
{ z }_{ 2 },\quad { z }_{ 3 },\quad { z }_{ 4 },\quad -------------\\
For\quad a\quad given\quad x\quad and\quad y\quad if\quad z\quad
is\quad irrational\quad Then\quad \\ { z }_{ 1 }<\quad { z }_{ 2 }
<\quad { z }_{ 3 }\quad <{ z }_{ 4 }\quad <\quad -------------------
to\quad \infty \quad But\quad however\quad if\quad z\quad is\quad
an\quad integer\quad then\\ { z }_{ 1 }\quad <\quad { z }_{ 2 }\quad
<\quad { z }_{ 3 }\quad <\quad { z }_{ 4 }--------<\quad { z }_{ r }
=\quad z\quad ={ \quad z }_{ r+1 }\quad =\quad { z }_{ r+2 }\quad
=\quad ------------(7)\\ If\quad the\quad last\quad term\quad for\quad
{ z }_{ r\quad }\quad { k }_{ r }{ p }^{ \beta }\quad then\quad
\quad { p }^{ \beta }\quad <\quad (x+y).\\ \therefore \quad the\quad
value\quad of\quad an\quad infinite\quad series\quad can\quad be\quad
obtained\quad by\quad using\quad finite\quad number\quad of\quad
terms.\\ As\quad this\quad is\quad not\quad possible\quad either\quad
z\quad is\quad irrational\quad or\quad 'p'\quad is\quad a\quad
divisor\quad of\quad x\quad or\quad y\quad or\quad z.\\ Similar\quad

series\quad can\quad be\quad developed\quad using\quad z\quad and\quad
x\quad and\quad z\quad and\quad y\quad which\quad are\quad given\quad
by\quad \\ \frac { x }{ z-y\quad } \quad =\quad { \{ \quad 1+\frac
{ { z }^{ p }-{ y }^{ p }-{ (z-y) }^{ p } }{ { { (z-y) }^{ p } } }
\quad \} }^{ \frac { 1 }{ p } }\quad and\quad \quad \frac { y }{ z-
x } \quad =\quad { \{ \quad 1+\frac { { z }^{ p }-{ x }^{ p }-{ (z-
x) }^{ p } }{ { (z-x) }^{ p } } \quad \} }^{ \frac { 1 }{ p } }\\
If\quad y\quad <\quad x\quad then\quad 2x\quad >\quad z\quad or\quad
x\quad >\quad (z-x)\quad \\ \frac { { z }^{ p }-{ x }^{ p }-{ (z-x) }
^{ p } }{ { (z-x) }^{ p } } \quad =\quad { (\frac { z }{ z-x }) }
^{ p-1 }+\quad { (\frac { z }{ z-x }) }^{ p-2 }{ (\frac { x }{ z-
x }) }^{ 1 }\quad +-----+\quad { (\frac { x }{ z-x }) }^{ p-1 }\quad
-1\quad >\quad 1\\ \therefore \quad the\quad terms\quad in\quad
the\quad series\quad deveped\quad for\quad 'y'\quad will\quad
tend\quad to\quad +\infty \quad or\quad -\infty .\\ \therefore \quad
given\quad z\quad and\quad x\quad with\quad 2x\quad >\quad z\quad
'y'\quad has\quad to\quad be\quad irrational\quad or\quad 'p'\quad
is\quad a\quad divisor\quad of\quad \\ x\quad ,\quad y\quad ,\quad
or\quad z.\quad \\ x\quad ,\quad y\quad ,\quad z\quad ,\quad { p }
_{ 4 }\quad ,\quad { p }_{ 5 }\quad \quad are\quad prime\quad to\quad
each\quad other.\\ So\quad if\quad { q }^{ r }\quad \quad is\quad
a\quad factor\quad either\quad { p }_{ 4 }\quad or\quad { p }
_{ 5\quad }and\quad x\quad +\quad y\quad -z\quad then\quad what\quad
is\quad applicable\quad to\quad 'p'\quad is\quad also\quad \\
applicable\quad to'q'.\quad \therefore \quad r=0\quad or\quad { p }
_{ 4 }\quad =\quad 1\quad and\quad { p }_{ 5 }\quad =\quad 1\\
hence\quad (x+y-z)\quad =\quad { p }^{ \alpha }{ p }_{ 1 }{ p }_{ 2 }
{ p }_{ 3 }.\quad \quad \therefore \quad { p }^{ p\alpha -1 }{ p }
_{ 3 }^{ p }\quad -\quad { p }_{ 1 }^{ p }\quad -\quad { p }_{ 2 }
^{ p }\quad =\quad 2{ \quad p }^{ \alpha }\quad { p }_{ 1 }\quad
{ p }_{ 2 }\quad { p }_{ 3 }\quad --------(8)\\ \\ As\quad eqn\quad
(8)\quad has\quad no\quad solution\quad Fermat's\quad last\quad
theorem\quad stands\quad prooved.\\ \\

