Google Plus 2014-04-11 - Posted by Hidayatullah Wirasandha to Mathematics/Math Questions

$$\left\{ x | x \in \mathbf{R} \wedge x > 0 \wedge 0 = 130\ 000 - 2\ 000 \times \frac{(1+x)^{144} - 1}{x(1+x)^{144}} + 2\ 500 \times \frac{\frac{1}{(x+1)^{144}} - 1}{1 - (x+1)^{12}} + 700 \times \frac{\frac{1}{(x+1)^{144}} - 1}{1 - (x+1)^{36}} - \frac{180\ 000}{(x+1)^{144}} \right\}$$

Let $y = (x+1)^{12}$. So RHS $\div$ 100 $= 1300 - 20 \times \frac{y^{12} - 1}{xy^{12}} + 25 \times \frac{\frac{1}{y^{12}} - 1}{1 - y} + 7 \times \frac{\frac{1}{y^{12}} - 1}{1 - y^3} - \frac{1800}{y^{12}}$

$$= 1300 + 20 \times \frac{1 - y^{12}}{xy^{12}} + 25 \times \frac{1 - y^{12}}{y^{12}(1-y)} + 7 \times \frac{1 - y^{12}}{y^{12}(1-y^3)} - \frac{1800}{y^{12}} = 0.$$

$$1300\ y^{12} + 20 \times \frac{1 - y^{12}}{x} + 25 \times \frac{1 - y^{12}}{(1-y)} + 7 \times \frac{1 - y^{12}}{(1-y^3)} - 1800 = 0.$$

$$1300\ y^{12} + 20 \times \frac{1 - y^{12}}{x} + 25 \times \frac{\cancel{(1-y)}(1 + y + y^2 \cdots + y^{11})}{\cancel{(1-y)}} + 7 \times \frac{\cancel{(1-y^3)}(1 + y^3 + y^6 + y^9)}{\cancel{(1-y^3)}} - 1800 = 0.$$

$$= 1300 + 20 \times \frac{1 - y^{12}}{xy^{12}} + 25 \times \frac{\cancel{(1-y)}(1 + y + y^2 + \cdots + y^{11})}{y^{12}\cancel{(1-y)}} + 7 \times \frac{\cancel{(1-y)}(1 + y + y^2 + \cdots + y^{11})}{y^{12}\cancel{(1-y)}(1 + y + y^2)} - \frac{1800}{y^{12}} = 0.$$