

In[1]:= **Reduce** $[y * (2 * y^2 - x^2) - x - 6970 == 0, \{x, y\}, \text{Integers}]$

Out[1]= $(x \mid y) \in \text{Integers} \&\& \left((x \leq -30 \&\& (y = \text{Root}[-6970 - x - x^2 \mp 1 + 2 \mp 1^3 \&, 1] \mid \mid y = \text{Root}[-6970 - x - x^2 \mp 1 + 2 \mp 1^3 \&, 2] \mid \mid y = \text{Root}[-6970 - x - x^2 \mp 1 + 2 \mp 1^3 \&, 3]) \mid \mid (-29 \leq x \leq 29 \&\& y = \text{Root}[-6970 - x - x^2 \mp 1 + 2 \mp 1^3 \&, 1]) \mid \mid (x \geq 30 \&\& (y = \text{Root}[-6970 - x - x^2 \mp 1 + 2 \mp 1^3 \&, 1] \mid \mid y = \text{Root}[-6970 - x - x^2 \mp 1 + 2 \mp 1^3 \&, 2] \mid \mid y = \text{Root}[-6970 - x - x^2 \mp 1 + 2 \mp 1^3 \&, 3]) \mid \mid \right)$

In[2]:= **Reduce** $[x * (2 * x^2 - y^2) - y - 6970 == 0, \{x, y\}, \text{Integers}]$

Out[2]= $(x \mid y) \in \text{Integers} \&\& \left(\left(x \leq -1 \&\& \left(y = -\frac{1}{2x} - \frac{\sqrt{1 - 27880x + 8x^4}}{2 \text{Abs}[x]} \mid \mid y = -\frac{1}{2x} + \frac{\sqrt{1 - 27880x + 8x^4}}{2 \text{Abs}[x]} \right) \right) \mid \mid (x = 0 \&\& y = -6970) \mid \mid \left(x \geq 16 \&\& \left(y = -\frac{1}{2x} - \frac{\sqrt{1 - 27880x + 8x^4}}{2 \text{Abs}[x]} \mid \mid y = -\frac{1}{2x} + \frac{\sqrt{1 - 27880x + 8x^4}}{2 \text{Abs}[x]} \right) \right) \right)$

In[3]:= **FindInstance** $[y * (2 * y^2 - x^2) - x - 6970 == 0, \{x, y\}, \text{Integers}]$

Out[3]= $\{\{x \rightarrow 38, y \rightarrow -24\}\}$

In[4]:= **FindInstance** $[y * (2 * y^2 - x^2) - x - 6970 == 0, \{x, y\}, \text{Integers}, 2]$

 **FindInstance:** Warning: FindInstance found only 1 instance(s), but it was not able to prove 2 instances do not exist.

Out[4]= $\{\{x \rightarrow 30, y \rightarrow -10\}\}$

In[5]:= **FindInstance** $[x * (2 * x^2 - y^2) - y - 6970 == 0, \{x, y\}, \text{Integers}]$

Out[5]= $\{\{x \rightarrow -1, y \rightarrow -83\}\}$

In[6]:= **FindInstance** $[x * (2 * x^2 - y^2) - y - 6970 == 0, \{x, y\}, \text{Integers}, 2]$

Out[6]= $\{\{x \rightarrow -1, y \rightarrow -83\}, \{x \rightarrow 0, y \rightarrow -6970\}\}$

In[7]:= **FindInstance** $[x * (2 * x^2 - y^2) - y - 6970 == 0, \{x, y\}, \text{Integers}, 3]$

Out[7]= $\{\{x \rightarrow -1, y \rightarrow -83\}, \{x \rightarrow -1, y \rightarrow 84\}, \{x \rightarrow 0, y \rightarrow -6970\}\}$

In[8]:= **FindInstance** $[x * (2 * x^2 - y^2) - y - 6970 == 0, \{x, y\}, \text{Integers}, 4]$

 **FindInstance:** Warning: FindInstance found only 3 instance(s), but it was not able to prove 4 instances do not exist.

Out[8]= $\{\{x \rightarrow -1, y \rightarrow -83\}, \{x \rightarrow -1, y \rightarrow 84\}, \{x \rightarrow 0, y \rightarrow -6970\}\}$