



Research Paper

Study of the Orbit of Planet Venus

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Orbital properties of Venus are studied.

(Kindly note that all the positions mentioned are based on Tropical Zodiac, except when specified)
 It is observed that the Synodic cycle of Venus is almost repeated with a periodicity of approximately 1247 years.

This is evident from below inferior Conjunction data-

Date	Zodiac	Position
27 Dec -417 (Julian) 18:00	Capricorn	1°19'46
18 Dec 830 (Julian) 19:30	Capricorn	1°23'08
22 Dec 2077 14:41	Capricorn	1°23'09
23 Dec 3324 08:13	Capricorn	1°36'10
24 Dec 4571 03:04	Capricorn	2°15'48

Data of Greatest elongation of Venus are analysed to understand Eccentricity of Venus, as below-

Reference	Earth	Earth Axis KM	Earth Position Helio Centric
Date	Semi Major Axis	149598.024	
03-01-2025	Perihelion	147098.450	103
08-07-2025	Aphelion	152097.597	286

Sl	Date	Venus Position Tropical	Elongn.	Elongn. Decimal	Earth Axis KM	Sin theta	Venus Axis KM	Venus Position Helio Centric
1	13-11-1973	278.017	E	47.1	148514.875	0.732542899	108793.517	8 (Aphelion)
2	12-01-2017	339.667	E	47.13333333	147348.4074	0.732938802	107997.3652	68
3	13-03-2060	39.533	E	46.21666667	149014.7897	0.721961534	107582.9461	128
4	14-05-1844	99.150	E	45.36666667	150665.5497	0.711617429	107216.2312	188 (Perihelion)
5	15-07-2130	158.817	E	45.51666667	151901.0013	0.713454305	108374.4234	248
6	14-09-2173	218.467	E	46.25	150187.8105	0.722363962	108490.2619	309

Eccentricity is calculated by using below formula;

$$e = \text{Radius (Aphelion - Perihelion)} / \text{Radius (Aphelion + Perihelion)}$$

$$e = 108793.517 - 107216.2312 / 108793.517 + 107216.2312$$

$$e = 0.00730192$$

$$\text{Semi Major Axis} = 108004.8741$$

Data of Heliocentric position of Venus (after interval of every 2922 days) are analysed to understand Orbital Period of Venus, as below-

Sl	date	Venus Position Helio Centric	Degree Cumulative	Degree Moved	Days per Orbit
1	18-01-2012	30.01666667	0.016666667		
2	18-01-2020	31.53333333	4681.533333	4681.516667	224.6964
3	18-01-2028	33.08333333	9363.083333	4681.55	224.6948
4	18-01-2036	34.61666667	14044.61667	4681.533333	224.6956
5	18-01-2044	36.15	18726.15	4681.533333	224.6956
6	18-01-2052	37.68333333	23407.68333	4681.533333	224.6956
7	18-01-2060	39.21666667	28089.21667	4681.533333	224.6956
8	18-01-2068	40.76666667	32770.76667	4681.55	224.6948
9	18-01-2076	42.28333333	37452.28333	4681.516667	224.6964

Average Days 224.6956

Orbital period of Venus is 224.6956 days

Data Sources:

1. www.astro.com
2. <https://horoscopes.astro-see.com/calculate-venus-cycle>
3. <https://en.wikipedia.org>