



Length of Valley Curve Formulas

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Examples!

Conversions!

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List of 20 Length of Valley Curve Formulas

Length of Valley Curve **2**

Design of Valley Curve &

1) Design Speed given Length of Valley Curve



Open Calculator 🗗

$$ext{ex} \ 4.09752 ext{m/s} = (7 ext{m} \cdot 2.34 ext{m} \cdot 4.2 ext{m/s})^{rac{1}{3}}$$

2) Design Speed given Length of Valley Curve and Time

fx
$$v=rac{L_{
m s}}{t}$$

Open Calculator 🗗

$$\boxed{1.75 \text{m/s} = \frac{7 \text{m}}{4 \text{s}}}$$

3) Design Speed given Total Length of Valley Curve

$$extbf{x} v = \left(\left(rac{L_s}{2}
ight)^2 \cdot rac{C_a}{N}
ight)^{rac{1}{3}}$$

Open Calculator

$$= \left(\left(\frac{7\mathrm{m}}{2} \right)^2 \cdot \frac{4.2\mathrm{m/s}}{0.88\mathrm{rad}} \right)^{\frac{1}{3}}$$



4) Deviation Angle given Total Length of Valley Curve

 $N = \left(rac{L_{
m s}}{2}
ight)^2 \cdot rac{C_{
m a}}{{
m v}^3}$

Open Calculator 🗗

5) Length of Valley Curve

 $\mathbf{f}_{\mathbf{k}} egin{aligned} \mathbf{L}_{\mathrm{s}} &= rac{\mathrm{v}^3}{\mathrm{R} \cdot \mathrm{C_a}} \end{aligned}$

Open Calculator

 $ext{ex} 12.71876 ext{m} = rac{\left(5 ext{m/s}
ight)^3}{2.34 ext{m} \cdot 4.2 ext{m/s}}$

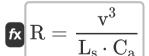
DT .

fx $L_{
m s}={
m v}\cdot{
m t}$

Open Calculator

7) Radius of Curve given Length of Valley Curve

6) Length of Valley Curve given Time and Design Speed 🗗

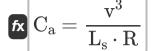


 $20m = 5m/s \cdot 4s$

= $4.251701 ext{m} = rac{\left(5 ext{m/s}
ight)^3}{7 ext{m} \cdot 4 \ 2 ext{m} \cdot s}$

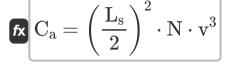
Open Calculator

8) Rate of Change of Acceleration



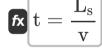
Open Calculator 🖸

- $ext{ex} \left[7.631258 ext{m/s} = rac{\left(5 ext{m/s}
 ight)^3}{7 ext{m} \cdot 2.34 ext{m}}
 ight]$
- 9) Rate of Change of Acceleration given Total Length of Valley Curve



Open Calculator

- = $1347.5 \text{m/s} = \left(\frac{7 \text{m}}{2}\right)^2 \cdot 0.88 \text{rad} \cdot (5 \text{m/s})^3$
- 10) Time given Length of Valley Curve and Design Speed

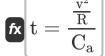


Open Calculator 🗗

$$\boxed{1.4s = \frac{7m}{5m/s}}$$



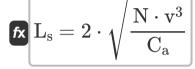
11) Time given Rate of Change of Acceleration



Open Calculator 🗗

 $m ex = rac{(5m/s)^2}{2.34m} \ rac{(5m/s)^2}{4.2m/s}$

12) Total Length of Valley Curve



Open Calculator

 $extbf{ex} 10.23533 ext{m} = 2 \cdot \sqrt{rac{0.88 ext{rad} \cdot (5 ext{m/s})^3}{4.2 ext{m/s}}}$

Length of Valley Curve greater than Stopping Sight Distance

13) Deviation Angle given Length of Valley Curve Greater than Stopping Sight Distance

$$N = rac{L_{
m s} \cdot \left(2 \cdot h_1 + 2 \cdot S \cdot an\left(lpha_{
m angle}
ight)
ight)}{S^2}$$

Open Calculator 🗗





14) Driver Eye Height given Length of Valley Curve Greater than Stopping Sight Distance

 $h_1 = rac{ ext{N} \cdot ext{S}^2 - 2 \cdot ext{L}_{ ext{s}} \cdot ext{S} \cdot anig(lpha_{ ext{angle}}ig)}{2 \cdot ext{L}_{ ext{s}}}$

Open Calculator 🗗

15) Inclination Angle given Length of Valley Curve Greater than Stopping Sight Distance

 $lpha_{
m angle} = a anigg(rac{{
m N}\cdot{
m S}^2 - 2\cdot{
m h}_1}{2\cdot{
m S}\cdot{
m L}_{
m s}}igg)$

Open Calculator

 $extbf{ex} 10.96106^\circ = a an igg(rac{0.88 ext{rad} \cdot (3.56 ext{m})^2 - 2 \cdot 0.75 ext{m}}{2 \cdot 3.56 ext{m} \cdot 7 ext{m}} igg)$

16) Length of Valley Curve Greater than Stopping Sight Distance

 $\mathbf{L}_{\mathrm{s}} = rac{\mathrm{N}\cdot\mathrm{S}^2}{2\cdot\mathrm{h}_1 + 2\cdot\mathrm{S}\cdot\mathrm{tan}(lpha_{\mathrm{angle}})}$

Open Calculator



Length of Valley Curve Less than Stopping Sight Distance

17) Deviation Angle Given Length of Valley Curve Less than Stopping Sight Distance

$$N = (2 \cdot S) - rac{2 \cdot h_1 + ig(2 \cdot S \cdot anig(lpha_{
m angle}ig)ig)}{L_{
m s}}$$

Open Calculator 🗗

18) Driver Sight Height given Length of Valley Curve Less than Stopping Sight Distance

$$\mathbf{h}_1 = rac{(\mathrm{L_s} - 2\cdot \mathrm{S})\cdot \mathrm{N} + 2\cdot \mathrm{S}\cdot \mathrm{tan}ig(lpha_{\mathrm{angle}}ig)}{2}$$

Open Calculator 🚰

19) Inclination Angle given Length of Valley Curve Less than Stopping Sight Distance

$$lpha_{
m angle} = a anigg(rac{(ext{L}_{
m S} - 2 \cdot ext{S}) \cdot ext{N} + 2 \cdot ext{h}_1}{2 \cdot ext{S}}igg)$$

Open Calculator

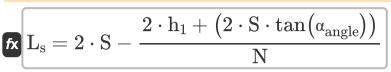
 $\boxed{ 11.08072° = a \tan \bigg(\frac{(7\text{m} - 2 \cdot 3.56\text{m}) \cdot 0.88\text{rad} + 2 \cdot 0.75\text{m}}{2 \cdot 3.56\text{m}} \bigg) }$





20) Length of Valley Curve Less than Stopping Sight Distance 🛂





Open Calculator 🚰

 $2\cdot0.75\mathrm{m} + (2\cdot3.56\mathrm{m}\cdot\tan(2°))$ $= 5.132914 \mathrm{m} = 2 \cdot 3.56 \mathrm{m} - -$ 0.88rad



Variables Used

- Ca Rate of Change of Acceleration (Meter per Second)
- h₁ Driver Sight Height (Meter)
- Ls Length of Curve (Meter)
- **N** Deviation Angle (Radian)
- R Radius of Curve (Meter)
- S Sight Distance (Meter)
- t Time (Second)
- **v** Design Speed (Meter per Second)
- α_{angle} Inclination (Degree)





Constants, Functions, Measurements used

- Function: atan, atan(Number)
 Inverse trigonometric tangent function
- Function: sqrt, sqrt(Number) Square root function
- Function: tan, tan(Angle)

 Trigonometric tangent function
- Measurement: Length in Meter (m)

 Length Unit Conversion
- Measurement: Time in Second (s)

 Time Unit Conversion
- Measurement: Speed in Meter per Second (m/s)
 Speed Unit Conversion
- Measurement: Angle in Radian (rad), Degree (°)
 Angle Unit Conversion





Check other formula lists

Length of Valley Curve
 Formulas

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