



Horizontal and Vertical Semi-Axis of Ellipse Formulas

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List of 13 Horizontal and Vertical Semi-Axis of Ellipse Formulas

Horizontal and Vertical Semi-Axis of Ellipse &

1) Major Horizontal Semi Axis for Deep Water Condition 🖸

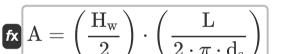


 $\left| \mathbf{A} = \left(rac{\mathbf{H}_{\mathrm{w}}}{2}
ight) \cdot \exp \left(2 \cdot \pi \cdot rac{\mathbf{Z}}{\mathbf{L}}
ight)
ight|$

Open Calculator

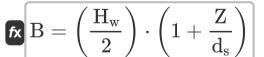
ex $7.402077 = \left(\frac{14\text{m}}{2}\right) \cdot \exp\left(2 \cdot \pi \cdot \frac{0.8}{90\text{m}}\right)$

2) Major Horizontal Semi Axis for Shallow Water Condition



Open Calculator

3) Minor Vertical Semi Axis for Shallow Water Condition



Open Calculator 2

ex $7.414815 = \left(\frac{14\text{m}}{2}\right) \cdot \left(1 + \frac{0.8}{13.5\text{m}}\right)$





4) Minor Vertical Semi-Axis for Deep Water Condition

 $\left| \mathbf{E} \right| \mathbf{B} = \left(rac{\mathbf{H}_{\mathrm{w}}}{2}
ight) \cdot \exp \left(2 \cdot \pi \cdot rac{\mathbf{Z}}{\mathbf{L}}
ight)$

Open Calculator

Open Calculator

ex $7.402077 = \left(\frac{14\text{m}}{2}\right) \cdot \exp\left(2 \cdot \pi \cdot \frac{0.8}{90\text{m}}\right)$

5) Phase Angle for Horizontal Fluid Particle Displacement 🖸

$$heta = a \mathrm{sin} \left(\left(\left(rac{arepsilon}{\mathrm{a}}
ight) \cdot \left(rac{\mathrm{sinh} \left(2 \cdot \pi \cdot rac{\mathrm{d}}{\lambda}
ight)}{\mathrm{cosh} \left(2 \cdot \pi \cdot rac{\mathrm{y}}{\lambda}
ight)}
ight)
ight)^2$$

 $oxed{ex} 0.000103^\circ = a \mathrm{sin} \Bigg(\Bigg(igg(rac{0.4 \mathrm{m}}{1.56 \mathrm{m}} \Bigg) \cdot \Bigg(rac{\mathrm{sinh} ig(2 \cdot \pi \cdot rac{1.05 \mathrm{m}}{26.8 \mathrm{m}} ig)}{\mathrm{cosh} ig(2 \cdot \pi \cdot rac{4.92 \mathrm{m}}{23.2} ig)} \Bigg) \Bigg)^2 \Bigg)^2$

6) Sea Bed Given Minor Vertical Semi-Axis for Shallow Water Condition

$$\mathbf{Z} = \mathrm{d_s} \cdot \left(\left(\frac{\mathrm{B}}{\frac{\mathrm{H_w}}{2}} \right) - 1 \right)$$

ex
$$0.800357=13.5 ext{m}\cdot\left(\left(rac{7.415}{rac{14 ext{m}}{2}}
ight)-1
ight)$$



7) Water Depth for Major Horizontal Semi-Axis for Shallow Water Condition

 $\mathbf{f}\mathbf{c} \, \mathrm{d_s} = rac{\mathrm{H_w \cdot L}}{4 \cdot \pi \cdot \mathrm{A}}$

Open Calculator 🚰

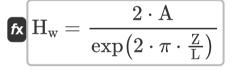
8) Water Depth Given Minor Vertical Semi-Axis for Shallow Water Condition

fx $d_{
m s} = rac{Z}{\left(rac{B}{rac{H_{
m w}}{2}}
ight)-1}$

Open Calculator

ex $13.49398 ext{m} = rac{0.8}{\left(rac{7.415}{rac{14 ext{m}}{2}}
ight) - 1}$

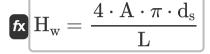
9) Wave Height for Major Horizontal Semi-Axis Deep Water Condition



ex
$$14.00004 \mathrm{m} = rac{2 \cdot 7.4021}{\mathrm{exp} ig(2 \cdot \pi \cdot rac{0.8}{90 \mathrm{m}} ig)}$$

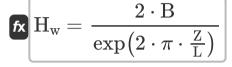


10) Wave Height for Major Horizontal Semi-Axis for Shallow Water Condition



Open Calculator 🚰

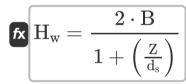
11) Wave Height for Minor Vertical Semi-Axis Deep Water Condition



Open Calculator

 $ext{ex} 14.02444 ext{m} = rac{2 \cdot 7.415}{\exp \left(2 \cdot \pi \cdot rac{0.8}{90 ext{m}}
ight)}$

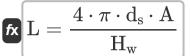
12) Wave Height Given Minor Vertical Semi-Axis for Shallow Water Condition



$$extbf{ex} 14.00035 ext{m} = rac{2 \cdot 7.415}{1 + \left(rac{0.8}{13.5 ext{m}}
ight)}$$



13) Wavelength for Major Horizontal Semi-Axis for Shallow Water Condition





Variables Used

- a Wave Amplitude (Meter)
- A Horizontal Semi-axis of Water Particle
- B Vertical Semi-Axis
- **d** Water Depth (Meter)
- **d**_s Water Depth for Semi-Axis of Ellipse (*Meter*)
- H_w Height of The Wave (Meter)
- L Length of Water Wave (Meter)
- y Elevation above the Bottom (Meter)
- Z Sea Bed Elevation
- E Fluid Particle Displacement (Meter)
- θ Phase Angle (Degree)
- λ Wavelength of Coast (Meter)





Constants, Functions, Measurements used

- Constant: pi, 3.14159265358979323846264338327950288
 Archimedes' constant
- Function: asin, asin(Number)

 The inverse sine function, is a trigonometric function that takes a ratio of two sides of a right triangle and outputs the angle opposite the side with the given ratio.
- Function: cosh, cosh(Number)

 The hyperbolic cosine function is a mathematical function that is defined as the ratio of the sum of the exponential functions of x and negative x to 2.
- Function: exp, exp(Number)

 n an exponential function, the value of the function changes by a constant factor for every unit change in the independent variable.
- Function: sin, sin(Angle)
 Sine is a trigonometric function that describes the ratio of the length of the opposite side of a right triangle to the length of the hypotenuse.
- Function: sinh, sinh(Number)
 The hyperbolic sine function, also known as the sinh function, is a mathematical function that is defined as the hyperbolic analogue of the sine function.
- Measurement: Length in Meter (m)
 Length Unit Conversion
- Measurement: Angle in Degree (°)
 Angle Unit Conversion





Check other formula lists

- Cnoidal Wave Theory Formulas
- Horizontal and Vertical Semi-Axis Formulas of Ellipse Formulas
- Wave Parameters Formulas
- Zero-Crossing Method



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