calculatoratoz.com

unitsconverters.com

First Order followed by Zero Order Reaction Formulas

Calculators! Examples! Conversions!

Bookmark **calculatoratoz.com**, **unitsconverters.com**

Widest Coverage of Calculators and Growing - **30,000+ Calculators!**
Calculate With a Different Unit for Each Variable - **In built Unit Conversion!**
Widest Collection of Measurements and Units - **250+ Measurements!**

Feel free to SHARE this document with your friends!

Please leave your feedback here...

© calculatoratoz.com. A softusvista inc. venture!

List of 10 First Order followed by Zero Order Reaction Formulas

First Order followed by Zero Order Reaction

1) Initial Reactant Concentration in First Order followed by Zero Order Reaction

Open Calculator

fx $$C_{A0} = \frac{C_{k0}}{\exp(-k_I \cdot \Delta t)}$$

ex $$84.61012\text{mol/m}^3 = \frac{24\text{mol/m}^3}{\exp(-0.42\text{s}^{-1} \cdot 3\text{s})}$$

2) Initial Reactant Concentration using Intermediate for First Order followed by Zero Order Reaction

Open Calculator

fx $$[A]_0 = \frac{C_R + (k_0 \cdot \Delta t)}{1 - \exp(-k_I \cdot \Delta t)}$$

ex $$41.18122\text{mol/m}^3 = \frac{10\text{mol/m}^3 + (6.5\text{mol/m}^3\text{*s} \cdot 3\text{s})}{1 - \exp(-0.42\text{s}^{-1} \cdot 3\text{s})}$$

3) Intermediate Concentration for First Order followed by Zero Order Reaction

Open Calculator

fx $$C_{R,1st\ order} = C_{A0} \cdot \left(1 - \exp(-k_I \cdot \Delta t) - \left(\frac{k_0 \cdot \Delta t}{C_{A0}}\right)\right)$$

ex $$37.80768\text{mol/m}^3 = 80\text{mol/m}^3 \cdot \left(1 - \exp(-0.42\text{s}^{-1} \cdot 3\text{s}) - \left(\frac{6.5\text{mol/m}^3\text{*s} \cdot 3\text{s}}{80\text{mol/m}^3}\right)\right)$$

4) Maximum Intermediate Concentration in First Order followed by Zero Order Reaction

Open Calculator

fx $$C_{R,max} = C_{A0} \cdot \left(1 - \left(\frac{k_0}{C_{A0} \cdot k_I} \cdot \left(1 - \ln\left(\frac{k_0}{C_{A0} \cdot k_I}\right)\right)\right)\right)$$

ex $$39.1007\text{mol/m}^3 = 80\text{mol/m}^3 \cdot \left(1 - \left(\frac{6.5\text{mol/m}^3\text{*s}}{80\text{mol/m}^3 \cdot 0.42\text{s}^{-1}} \cdot \left(1 - \ln\left(\frac{6.5\text{mol/m}^3\text{*s}}{80\text{mol/m}^3 \cdot 0.42\text{s}^{-1}}\right)\right)\right)\right)$$

© calculatoratoz.com. A softusvista inc. venture!

5) Rate Constant for First Order Reaction in First Order followed by Zero Order Reaction

Open Calculator

fx $$k_I = \left(\frac{1}{\Delta t}\right) \cdot \ln\left(\frac{C_{A0}}{C_{k0}}\right)$$

ex $$0.401324s^{-1} = \left(\frac{1}{3s}\right) \cdot \ln\left(\frac{80mol/m^3}{24mol/m^3}\right)$$

6) Rate Constant for First Order Reaction using Rate Constant for Zero Order Reaction

Open Calculator

fx $$k_I = \left(\frac{1}{\Delta t}\right) \cdot \ln\left(\frac{C_{A0}}{C_{A0} - (k_0 \cdot \Delta t) - C_R}\right)$$

ex $$0.153351s^{-1} = \left(\frac{1}{3s}\right) \cdot \ln\left(\frac{80mol/m^3}{80mol/m^3 - (6.5mol/m^3*s \cdot 3s) - 10mol/m^3}\right)$$

7) Rate Constant for Zero Order Reaction using Rate Constant for First Order Reaction

Open Calculator

fx $$k_{0,k1} = \left(\frac{C_{A0}}{\Delta t}\right) \cdot \left(1 - \exp((-k_I) \cdot \Delta t) - \left(\frac{C_R}{C_{A0}}\right)\right)$$

ex $$15.76923mol/m^3*s = \left(\frac{80mol/m^3}{3s}\right) \cdot \left(1 - \exp((-0.42s^{-1}) \cdot 3s) - \left(\frac{10mol/m^3}{80mol/m^3}\right)\right)$$

8) Reactant Concentration in First Order followed by Zero Order Reaction

Open Calculator

fx $$C_{k0} = C_{A0} \cdot \exp(-k_I \cdot \Delta t)$$

ex $$22.69232mol/m^3 = 80mol/m^3 \cdot \exp(-0.42s^{-1} \cdot 3s)$$

9) Time at Max Intermediate in First Order followed by Zero Order Reaction

Open Calculator

fx $$\tau_{R,max} = \left(\frac{1}{k_I}\right) \cdot \ln\left(\frac{k_I \cdot C_{A0}}{k_0}\right)$$

ex $$3.911247s = \left(\frac{1}{0.42s^{-1}}\right) \cdot \ln\left(\frac{0.42s^{-1} \cdot 80mol/m^3}{6.5mol/m^3*s}\right)$$

10) Time Interval for First Order Reaction in First Order followed by Zero Order Reaction

Open Calculator

fx $$\Delta t = \left(\frac{1}{k_I}\right) \cdot \ln\left(\frac{C_{A0}}{C_{k0}}\right)$$

ex $$2.866602\text{s} = \left(\frac{1}{0.42\text{s}^{-1}}\right) \cdot \ln\left(\frac{80\text{mol/m}^3}{24\text{mol/m}^3}\right)$$

© calculatoratoz.com. A softusvista inc. venture!

Variables Used

- $[A]_0$ Initial Reactant Concentration using Intermediate *(Mole per Cubic Meter)*
- C_{A0} Initial Reactant Concentration for Multiple Rxns *(Mole per Cubic Meter)*
- C_{k0} Reactant Concentration for Zero Order Series Rxn *(Mole per Cubic Meter)*
- C_R Intermediate Concentration for Series Rxn *(Mole per Cubic Meter)*
- $C_{R,1st\ order}$ Intermediate Conc. for 1st Order Series Rxn *(Mole per Cubic Meter)*
- $C_{R,max}$ Maximum Intermediate Concentration *(Mole per Cubic Meter)*
- k_0 Rate Constant for Zero Order Rxn for Multiple Rxns *(Mole per Cubic Meter Second)*
- $k_{0,k1}$ Rate Constant for Zero Order Rxn using k1 *(Mole per Cubic Meter Second)*
- k_1 Rate Constant for First Step First Order Reaction *(1 Per Second)*
- Δt Time Interval for Multiple Reactions *(Second)*
- $\tau_{R,max}$ Time at Maximum Intermediate Concentration *(Second)*

© calculatoratoz.com. A softusvista inc. venture!

Constants, Functions, Measurements used

- Function: **exp**, exp(Number)
  Exponential function
- Function: **ln**, ln(Number)
  Natural logarithm function (base e)
- Measurement: **Time** in Second (s)
  Time Unit Conversion
- Measurement: **Molar Concentration** in Mole per Cubic Meter (mol/m³)
  Molar Concentration Unit Conversion
- Measurement: **Reaction Rate** in Mole per Cubic Meter Second (mol/m³*s)
  Reaction Rate Unit Conversion
- Measurement: **First Order Reaction Rate Constant** in 1 Per Second (s^{-1})
  First Order Reaction Rate Constant Unit Conversion

Check other formula lists

- **Basics of Potpourri Reactions Formulas**
- **First Order followed by Zero Order Reaction Formulas**
- **Zero Order followed by First Order Reaction Formulas**

Feel free to SHARE this document with your friends!

PDF Available in

English Spanish French German Russian Italian Portuguese Polish Dutch

1/16/2024 | 6:14:01 AM UTC

Please leave your feedback here...

© calculatoratoz.com. A softusvista inc. venture!