

mobius

Exponential Function Solving - Decay (Discrete, Mis-matched Time Units)



1

Scenario to Rate

How would you solve for the rate given this scenario?

A toxin starts at a concentration of 300mg/L. Each hourly dialysis reduces it by a certain percent. After 5 days it has decreased to a concentration of 187mg/L.

A
$$B$$
 $r=-(rac{C}{C_0})^{rac{r\cdot 24}{2}}-1$ $r=-(rac{C}{C_0})^{rac{1}{r\cdot 24}}-1$

2

A charitable endowment starts with \$400. Each daily it disburses a certain percent of its remaining funds. After 2 years its funds have decreased to \$361. How would you solve for the rate given this scenario?

$$egin{aligned} egin{aligned} \mathsf{A} & = -(rac{P}{P_0})^{rac{1}{t \cdot 365}} - 1 & \mathsf{B} & = -(rac{P}{P_0})^{rac{t \cdot 365}{2}} - 1 \ & \mathsf{C} & = -(rac{P}{P_0})^{rac{1}{365}} + 1 \end{aligned}$$

3

A toxin starts at a concentration of 400mg/L. Each weekly dialysis reduces it by a certain percent. After 14 days it has decreased to a concentration of 144mg/L.

How would you solve for the rate given this scenario?

$$egin{aligned} egin{aligned} \mathsf{A} & = -(rac{C}{C_0})^{rac{1}{7}} - 1 & \mathsf{B} & = -(rac{C}{C_0})^{rac{1}{1\cdot7}} + 1 \ & \mathsf{C} & = -(rac{C}{C_0})^{rac{t}{2}} - 1 \end{aligned}$$

4

A toxin starts at a concentration of 500mg/L. Each daily dialysis reduces it by a certain percent. After 9 weeks it has decreased to a concentration of 346mg/L.

How would you solve for the rate given this scenario?

$$egin{aligned} egin{aligned} \mathsf{A} & r = -(rac{C}{C_0})^{rac{t \cdot 7}{2}} - 1 & \mathsf{B} & r = -(rac{C}{C_0})^{rac{1}{7}} + 1 \ & \mathsf{C} & r = -(rac{C}{C_0})^{rac{1}{t \cdot 7}} - 1 \end{aligned}$$

5

A charitable endowment starts with \$800. Each yearly it disburses a certain percent of its remaining funds. After 1095 days its funds have decreased to \$0.

How would you solve for the rate given this scenario?

$$egin{aligned} egin{aligned} \mathsf{A} & = -(rac{P}{P_0})^{rac{1}{t \cdot 365}} + 1 & \mathsf{B} & = -(rac{P}{P_0})^{rac{1}{2}} - 1 \ & \mathsf{C} & = -(rac{P}{P_0})^{rac{365}{2}} - 1 \end{aligned}$$

6

A charitable endowment starts with \$300. Each daily it disburses a certain percent of its remaining funds. After 6 years its funds have decreased to \$220. How would you solve for the rate given this scenario?

$$egin{aligned} egin{aligned} \mathsf{A} &= -(rac{P}{P_0})^{rac{t\cdot 365}{2}} - 1 & \mathsf{B} &= -(rac{P}{P_0})^{rac{1}{t\cdot 365}} - 1 \ & \mathsf{C} &= -(rac{P}{P_0})^{rac{1}{2}} + 1 \end{aligned}$$

7

A toxin starts at a concentration of 600mg/L. Each weekly dialysis reduces it by a certain percent. After 14 days it has decreased to a concentration of 186mg/L.

How would you solve for the rate given this scenario?

$$egin{aligned} egin{aligned} \mathsf{A} & r = -(rac{C}{C_0})^{rac{1}{t \cdot 7}} + 1 & \mathsf{B} \\ r & r = -(rac{C}{C_0})^{rac{t}{7}} - 1 & \mathsf{C} \\ r & r & r = -(rac{C}{C_0})^{rac{t}{7}} - 1 & \mathsf{C} \end{aligned}$$

8

A charitable endowment starts with \$800. Each weekly it disburses a certain percent of its remaining funds. After 14 days its funds have decreased to \$289. How would you solve for the rate given this scenario?

$oxed{egin{array}{c} A \ r = -(rac{P}{P_0})^{rac{1}{ ilde{t}}} - 1 \end{array}}$	$egin{aligned} B \ r = -(rac{P}{P_0})^{rac{t}{2}} - 1 \end{aligned}$
$\overset{ extsf{C}}{r}=-(rac{P}{P_0})^{rac{1}{t\cdot 7}}+1$	