

mobius

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



Scenario to Starting Value

A toxin starts at a certain concentration. Each weekly dialysis reduces it by 7%. After 28 days it has decreased to a concentration of 65mg/L.

How would you solve for the starting concentration given this scenario?

$$egin{aligned} egin{aligned} egin{aligned} \hat{C}_0 &= C \cdot (1-r)^{t \cdot 7} \ \end{pmatrix}^{\mathsf{B}} C_0 &= rac{C}{(1-r)^{rac{t}{7}}} \ \end{pmatrix}^{\mathsf{C}} C_0 &= rac{C}{(1+r)^{rac{t}{7}}} \end{aligned}$$

A charitable endowment starts with a certain amount of money. Each yearly it disburses 7% of its remaining funds. After 1460 days its funds have decreased to \$0.

How would you solve for the starting cash given this scenario?

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

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A toxin starts at a certain concentration. Each weekly dialysis reduces it by 7%. After 63 days it has decreased to a concentration of 4mg/L.

How would you solve for the starting concentration given this scenario?

$$egin{aligned} egin{aligned} egin{aligned} egin{aligned} egin{aligned} egin{aligned} \dot{C}_0 &= C \cdot (1-r)^{t\cdot 7} \end{aligned} & egin{aligned} \mathsf{C}_0 &= rac{C}{(1-r)^{rac{t}{7}}} \end{aligned}$$

A toxin starts at a certain concentration. Each

concentration. Each weekly dialysis reduces it by 9%. After 56 days it has decreased to a concentration of 3mg/L. How would you solve for the starting concentration given this scenario?

$$egin{aligned} \mathsf{A} \, C_0 &= rac{C}{(1+r)^{rac{t}{7}}} & \mathsf{B}_0 &= C \cdot (1-r)^{t\cdot 7} \ & \mathsf{C} \, C_0 &= rac{C}{(1-r)^{rac{t}{7}}} & \end{aligned}$$

5

A charitable endowment starts with a certain amount of money. Each daily it disburses 4% of its remaining funds. After 2 years its funds have decreased to \$276. How would you solve for the starting cash given this scenario?

$$egin{align} egin{align} egin{align} egin{align} egin{align} P_0 &= rac{P}{(1-r)^{t\cdot 365}} \ egin{align} egin{align} egin{align} egin{align} egin{align} E_0 &= rac{P}{(1+r)^{t\cdot 365}} \ egin{align} e$$

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4

A charitable endowment starts with a certain amount of money. Each weekly it disburses 3% of its remaining funds. After 49 days its funds have decreased to \$112. How would you solve for the starting cash given this scenario?

$$egin{align} \mathsf{A} \ P_0 &= rac{P}{(1-r)^{rac{t}{7}}} & egin{align} \mathsf{B}_0 &= P \cdot (1-r)^{t \cdot 7} \ & \mathsf{C} \ P_0 &= rac{P}{(1+r)^{rac{t}{7}}} & & & \end{aligned}$$

7

A charitable endowment starts with a certain amount of money. Each daily it disburses 9% of its remaining funds. After 6 weeks its funds have decreased to \$283. How would you solve for the starting cash given this scenario?

$$egin{aligned} \mathsf{A}_{P_0} &= rac{P}{(1+r)^{t\cdot 7}} & \mathsf{B}_{P_0} &= rac{P}{(1-r)^{t\cdot 7}} \ P_0 &= P \cdot (1-r)^{rac{t}{7}} \end{aligned}$$

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A charitable endowment starts with a certain amount of money. Each yearly it disburses 3% of its remaining funds. After 730 days its funds have decreased to \$0.

How would you solve for the starting cash given this scenario?

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