

2022 Calculus BC Logistic Growth Model (Rogowski 9.4)

Lesson 333 | Calculus BC | Logistic growth

<https://www.youtube.com/watch?v=BBk8W4tp5i4>

Original practice aligned to the saved video title.

Name: _____ Date: _____ Show your reasoning.

01

A population is $P(t)=800/(1+4e^{(-4t)})$. Find $P(0)$, the carrying capacity, and the time it reaches half capacity.

02

A population is $P(t)=700/(1+14e^{(-6t)})$. Find $P(0)$, the carrying capacity, and the time it reaches half capacity.

03

A population is $P(t)=1200/(1+6e^{(-3t)})$. Find $P(0)$, the carrying capacity, and the time it reaches half capacity.

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04

A population is $P(t)=800/(1+4e^{-5t})$. Find $P(0)$, the carrying capacity, and the time it reaches half capacity.

05

A population is $P(t)=1400/(1+6e^{-6t})$. Find $P(0)$, the carrying capacity, and the time it reaches half capacity.

06

A population is $P(t)=900/(1+11e^{-2t})$. Find $P(0)$, the carrying capacity, and the time it reaches half capacity.

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01

A population is $P(t) = 800/(1 + 4e^{-4t})$. Find $P(0)$, the carrying capacity, and the time it reaches half capacity.

$P(0) = 160$. As $t \rightarrow \infty$, the exponential tends to 0, so capacity = 800. Half capacity requires $4e^{-4t} = 1$; $t = \ln(4)/4$.

02

A population is $P(t) = 700/(1 + 14e^{-6t})$. Find $P(0)$, the carrying capacity, and the time it reaches half capacity.

$P(0) = 140/3$. As $t \rightarrow \infty$, the exponential tends to 0, so capacity = 700. Half capacity requires $14e^{-6t} = 1$; $t = \ln(14)/6$.

03

A population is $P(t) = 1200/(1 + 6e^{-3t})$. Find $P(0)$, the carrying capacity, and the time it reaches half capacity.

$P(0) = 1200/7$. As $t \rightarrow \infty$, the exponential tends to 0, so capacity = 1200. Half capacity requires $6e^{-3t} = 1$; $t = \ln(6)/3$.

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04

A population is $P(t)=800/(1+4e^{-5t})$. Find $P(0)$, the carrying capacity, and the time it reaches half capacity.

$P(0)=160$. As $t \rightarrow \infty$, the exponential tends to 0, so capacity=800. Half capacity requires $4e^{-5t}=1$; $t=\ln(4)/5$.

05

A population is $P(t)=1400/(1+6e^{-6t})$. Find $P(0)$, the carrying capacity, and the time it reaches half capacity.

$P(0)=200$. As $t \rightarrow \infty$, the exponential tends to 0, so capacity=1400. Half capacity requires $6e^{-6t}=1$; $t=\ln(6)/6$.

06

A population is $P(t)=900/(1+11e^{-2t})$. Find $P(0)$, the carrying capacity, and the time it reaches half capacity.

$P(0)=75$. As $t \rightarrow \infty$, the exponential tends to 0, so capacity=900. Half capacity requires $11e^{-2t}=1$; $t=\ln(11)/2$.