Watch. Practice. Understand. | Lesson 333

2022 Calculus BC Logistic Growth Model (Rogowski 9.4)

Watch the matching video: https://www.youtube.com/watch?v=BBk8W4tp5i4

Practice focus: Logistic growth

Original extra practice matched to the listed lesson topic.

Name: _____ Date: _____ Show your reasoning and check units.

01 For P'=0.2P(1-P/1000), find equilibrium populations.

02 For that model, where is the positive growth rate largest?

03 Evaluate P'=0.2P(1-P/1000) at P=200.

04 For P(t)=1000/(1+9e^(-0.2t)), find P(0) and its long-run limit.

Worked answers | Lesson 333

2022 Calculus BC Logistic Growth Model (Rogowski 9.4)

Watch the matching video: https://www.youtube.com/watch?v=BBk8W4tp5i4

Practice focus: Logistic growth

Original extra practice matched to the listed lesson topic.

01 For P'=0.2P(1-P/1000), find equilibrium populations.

Set P'=0: P=0 and P=1000.

02 For that model, where is the positive growth rate largest?

The rate is a concave-down quadratic in P, with vertex at P=500.

03 Evaluate P'=0.2P(1-P/1000) at P=200.

P'=0.2(200)(0.8)=32 population units per unit time.

04 For P(t)=1000/(1+9e^(-0.2t)), find P(0) and its long-run limit.

P(0)=1000/10=100. As t->infinity, denominator tends to1, so limit is1000.