

7. A population y changes at a rate modeled by the differential equation $\frac{dy}{dt} = 0.2y(1000 - y)$, where t is measured in years. What are all values of y for which the population is increasing at a decreasing rate?
- (A) 500 only
 - (B) $0 < y < 500$ only
 - (C) $500 < y < 1000$ only
 - (D) $0 < y < 1000$
 - (E) $y > 1000$

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13. A population of wolves is modeled by the function P and grows according to the logistic differential equation $\frac{dP}{dt} = 5P\left(1 - \frac{P}{5000}\right)$, where t is the time in years and $P(0) = 1000$. Which of the following statements are true?

- I. $\lim_{t \rightarrow \infty} P(t) = 5000$
 - II. $\frac{dP}{dt}$ is positive for $t > 0$.
 - III. $\frac{d^2P}{dt^2}$ is positive for $t > 0$.
- (A) I only
 - (B) II only
 - (C) I and II only
 - (D) I and III only
 - (E) I, II, and III