Additional Chapter 5-6 Review Questions

No Calculator

1) Bacteria in a certain culture increase at a rate proportional to the number present. If the number of bacteria doubles in three hours, in how many hours will the number of bacteria triple?

A) $\frac{3\ln 3}{\ln 2}$ B) $\frac{2\ln 3}{\ln 2}$ C) $\frac{\ln 3}{\ln 2}$ D) $\ln\left(\frac{27}{2}\right)$ E) $\ln\left(\frac{9}{2}\right)$

2) Determine if $y = e^{2x}$ is a solution of the differential equation. $y'' - 3y' + 2y = 0$

3) Determine if $y = 2\sin 2x$ is a solution of the differential equation. $y^{(4)} - 16y = 0$

4) Solve the differential equation: The rate of change of y with respect to t is inversely proportional to t.

A) $y = k\ln|t| + C$ B) $y = kt^2 + C$ C) $y = Ce^{kt}$ D) $y = kt + C$

Calculator

5) Bacteria in a culture increase at a rate proportional to the number present. An initial population of 200 triples in 10 hours. If this pattern of increase continues, then the approximate number of bacteria after 1 full day is

A) 1160 B) 1440 C) 2408 D) 2793 E) 8380

6) Water flows continuously from a large tank at a rate proportional to the amount of water remaining in the tank. There was initially 10,000 cubic feet of water in the tank and at time t = 4 hours, there was 8000 cubic feet of water.

a) What is the constant of proportionality?

b) To the nearest cubic foot, how much water remained in the tank at time t = 7 hours?

ANSWERS

1) A
2) yes
3) yes
4) A
5) D
6a) -0.0557858878
6b) 6767