

Homework 31: 11.1 differential equations

- (1) 11.1 # 18, 24.
- (2) If $dy/dx = \sin x$ and $y(\pi) = 2$, find the general solution and the particular solution. Draw the family of solutions and show the particular solution on the plot.
- (3) (a) Show that

$$P = \frac{1}{1 + e^{-t}}$$

satisfies the *logistic equation* $dP/dt = P(1 - P)$.

- (b) What is the limiting value of P as $t \rightarrow \infty$?
- (4) Problem #2 from a previous edition of the textbook:

2. Match the graphs in Figure 11.4 with the following descriptions.

- (a) The population of a new species introduced onto a tropical island
- (b) The temperature of a metal ingot placed in a furnace and then removed
- (c) The speed of a car traveling at uniform speed and then braking uniformly
- (d) The mass of carbon-14 in a historical specimen
- (e) The concentration of tree pollen in the air over the course of a year.

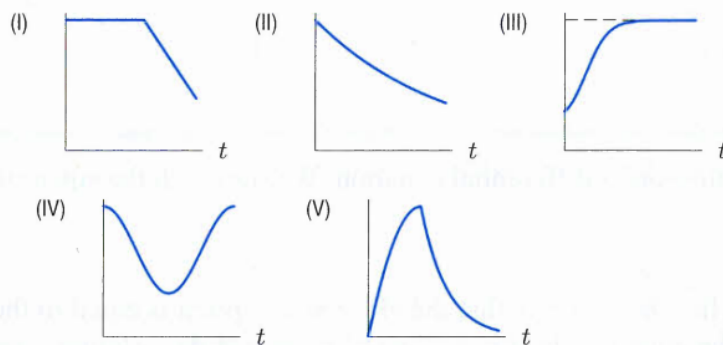


Figure 11.4