Homework # 5
Math 211

Problems for Section 1.5

1. The following functions give the populations of four towns with time t in years.

(i) $P = 600(1.12)^t$ (ii) $P = 1{,}000(1.03)^t$
(iii) $P = 200(1.08)^t$ (iv) $P = 900(0.90)^t$

(a) Which town has the largest percent growth rate? What is the percent growth rate?
(b) Which town has the largest initial population? What is that initial population?
(c) Are any of the towns decreasing in size? If so, which one(s)?

5. The gross domestic product, G, of Switzerland was 310 billion dollars in 2007. Give a formula for G (in billions of dollars) t years after 2007 if G increases by
(a) 3% per year **(b)** 8 billion dollars per year

7. An air-freshener starts with 30 grams and evaporates. In each of the following cases, write a formula for the quantity, Q grams, of air-freshener remaining t days after the start and sketch a graph of the function. The decrease is:

(a) 2 grams a day **(b)** 12% a day

9. A 50 mg dose of quinine is given to a patient to prevent malaria. Quinine leaves the body at a rate of 6% per hour.

(a) Find a formula for the amount, A (in mg), of quinine in the body t hours after the dose is given.
(b) How much quinine is in the body after 24 hours?
(c) Graph A as a function of t.
(d) Use the graph to estimate when 5 mg of quinine remains.

11. The consumer price index (CPI) for a given year is the amount of money in that year that has the same purchasing power as \$100 in 1983. At the start of 2009, the CPI was 211. Write a formula for the CPI as a function of t, years after 2009, assuming that the CPI increases by 2.8% every year.

Solutions

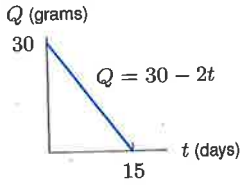
Section 1.5

1 (a) (i), 12%
(b) (ii), 1000
(c) Yes, (iv)

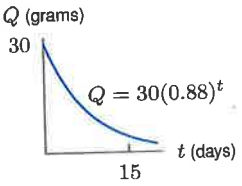
3 (a) II
(b) I
(c) III
(d) V

5 (a) $G = 310(1.03)^t$
(b) $G = 310 + 8t$

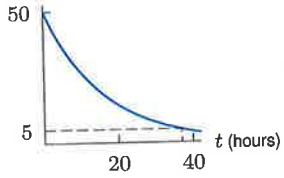
7 (a) $Q = 30 - 2t$



(b) $Q = 30(0.88)^t$



9 (a) $A = 50(0.94)^t$
(b) 11.33 mg
(c) A (mg)



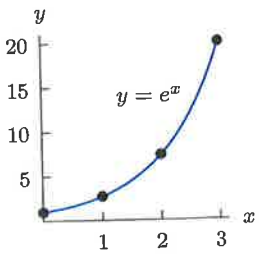
(d) About 37 hours

11 CPI $= 211(1.028)^t$

13 (a)

x	0	1	2	3
e^x	1	2.72	7.39	20.09

(b)



(c)

x	0	1	2	3
e^{-x}	1	0.37	0.14	0.05