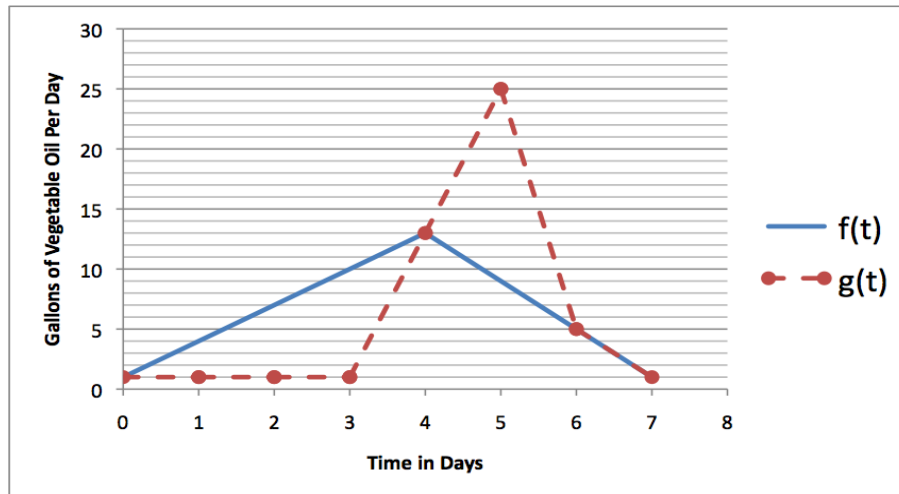


5. [13 points] In 2008, the burrito chain BTB began to operate a “Party Bus” powered by waste vegetable oil. If  $t$  is the number of days since 12:01 a.m. on October 11, 2010, then  $f(t)$  is the amount in gallons per day of waste vegetable oil produced by BTB restaurant chain at time  $t$  and  $g(t)$  is the amount consumed by the party bus in gallons per day at time  $t$ . Let  $R(t)$  be the size of BTB’s vegetable oil reserves in gallons at time  $t$ . If BTB has 20 gallons held in reserve at time  $t = 0$ , use the graphs below to answer the following questions. All the questions below consider only  $0 \leq t \leq 7$ .



- a. [1 point] Estimate  $R(3)$
- b. [2 points] When does BTB have a maximum volume of vegetable oil in reserve?
- c. [3 points] Suppose you need a ride to the airport on October 16. Will BTB have any vegetable oil in reserve to power their bus and drive you to the airport that day?
- d. [3 points] Find all critical points of  $R(t)$ .
- e. [4 points] On what intervals is  $R(t)$  concave up? On what intervals is  $R(t)$  concave down?