a 17. The canola oil industry is perfectly competitive. Every producer has the following long-run total cost function: $LTC = 2Q^3 - 15Q^2 + 40Q$, where Q is measured in tons of canola oil. The corresponding marginal cost function is given by $LMC = 6Q^2 - 30Q + 40$.

  a. Calculate and graph the long-run average total cost of producing canola oil that each firm faces for values of Q from 1 to 10.
  b. What will the long-run equilibrium price of canola oil be?
  c. How many units of canola oil will each firm produce in the long run?
  d. Suppose that the market demand for canola oil is given by $Q = 999 - 0.25P$. At the long-run equilibrium price, how many tons of canola oil will consumers demand?
  e. Given your answer to (d), how many firms will exist when the industry is in long-run equilibrium?
  f. Use calculus to confirm that marginal cost is as given in the problem.
  g. Calculate consumer surplus in the long-run equilibrium using calculus. (Hint: Remember how consumer surplus is calculated in the Appendix to Chapter 3.)