(1) Upon studying low bids for shipping contracts, a microcomputer manufacturing company finds that intrastate contracts have low bids that are uniformly distributed between 20 and 25, in units of thousands of dollars. Find the probability that the low bid on the next intrastate shipping contract

    (a) is below $22,000.

    (b) is in excess of $24,000.

(2) The operator of a pumping station has observed that demand for water during early after- noon hours has an approximately exponential distribution with mean 100 cfs (cubic feet per second).

    (a) Find the probability that the demand will exceed 200 cfs during the early afternoon on a randomly selected day.

    (b) What water-pumping capacity should the station maintain during early afternoons so that the probability that demand will exceed capacity on a randomly selected day is only .01?

(3) A gasoline wholesale distributor has bulk storage tanks that hold fixed supplies and are filled every Monday. Of interest to the wholesaler is the proportion of this supply that is sold during the week. Over many weeks of observation, the distributor found that this proportion could be modeled by a beta distribution with $\alpha = 4$ and $\beta = 2$. Find the probability that the wholesaler will sell at least 90% of her stock in a given week.

(4) Show that $\Gamma\left(\frac{7}{2}\right) = \frac{15}{8}\sqrt{\pi}$.