Application of Limit

Questions

1. For the demand function $p = \frac{3}{x-2}$ (where p is price and x is quantity demanded, show by using concept of limit, that the demand increase to infinitely large amount as the price falls. Also, show that total revenue reaches to definite value as the quantity demanded increases indefinitely.
2. For the demand function $p = \frac{a}{x+b}$ (where p is price and x is quantity demanded and a & b are positive constants), show by using concept of limit, that the demand increase to infinitely large amount as the price falls. Also, show that total revenue approaches to limiting value as the quantity demanded increases indefinitely.
3. For the demand function $p = \frac{2a}{x-6b}$ (where p is price and x is quantity demanded and a & b are positive constants), show by using concept of limit, that the demand increase to infinitely large amount as the price falls. Also, show that total revenue reaches to limiting value as the quantity demanded increases indefinitely.
4. Let the demand function $p = \frac{2x+5}{x^2+5x+5}$ (where p is price and x is quantity demanded), show by using concept of limit, that the price falls as the quantity demanded increases to infinitely large. Also, show that the revenue tends to limiting value as the quantity demanded increases infinitely large.
5. Let the demand function $p + 1 = \frac{20}{q}$ (where p is price and q is quantity demanded), show by using concept of limit, that the price falls as the quantity demanded increases to infinitely large. Also, show that the revenue falls as the price falls.
6. Let the demand function $p = \frac{3q+8}{q^2+7q+7}$ (where p is price and q is quantity demanded), show by using concept of limit, that the price falls as the quantity demanded increases to infinitely large. Also,

show that the revenue tends to limiting value as the quantity demanded increases infinitely large.

7. A company finds its profit function $p(x) = \frac{26x-25}{x}$ where *profit* is in thousands of rupees and *x* is number of items (in hundreds) sold. What is the limit of the company's profit as the number of items sold increase without bound (approach to infinity)?
8. Sagarmatha Cement has shown that the cost C of removing *p* percent of the particulate pollution from the smokestack emissions at one of its plants is $C(p) = \frac{7300\,p}{100-p}$
   a) Find the cost of removing 90% of the pollution.
   b) Find $\lim_{p\to 100^-} C(p)$.
   c) Is complete purity possible? Explain.
9. Suppose that the cost C of obtaining water that contains *p* percent impurities is given by $C(p) = \frac{120000}{p} - 1200$
   a) Find the $\lim_{p\to 100^-} C(p)$, if exists.
   b) Find $\lim_{p\to 100^-} C(p)$.
   c) Is complete purity possible? Explain.
10. Suppose that the cost C of removing *p* percent of the particulate pollution from the smokestacks of an industrial plants is given by $C(p) = \frac{45000}{100-p} - 9000$
   d) Find the $\lim_{p\to 100^-} C(p)$, if exists.
   e) Find $\lim_{p\to 75} C(p)$.
   f) Can 100% of the particulate pollution be removed? Explain.

Application of Continuity

Questions

1. A Company's salesperson receives a monthly salary and commission payments S(x) in rupees, according to the following schedule, where x represents the number of item sold.

$$S(x) = \begin{cases} 500 + 150x & for\ 0 \le x \le 5 \\ 1230 + 100(x-5) & for\ 5 \le x \le 10 \\ 1800 + 50(x-10) & for\ 10 < x \end{cases}$$

   Assuming the function S to be defined for all non-negative real numbers x, find any numbers where S is discontinuous.

2. Suppose that the cost C of removing p percent of the impurity from the waste water in a manufacturing process is given by $C(p) = \frac{9800p}{101-p}$.

   Is this function continuous for all those p-values for which the problem make sense?