

1. The combined electrical resistance of two resistances, R_1 and R_2 , connected in parallel is, in ohms,

$$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}.$$

- If R_1 and R_2 are increasing at rates 0.5 and 0.4 ohms/sec, respectively, find the rate at which R is changing when $R_1 = 100$ and $R_2 = 200$.
2. A light house is located on a small island 3 km away from the nearest point P on a straight shoreline. The light makes 4 revolutions/minute. How fast is the beam moving along the shore when the point at which the beam meets the shore is 1 km away from P ?
 3. If the rate at which a snowball melts is proportional to its surface area, what can you say about the rate of change of the snowball's radius?
 4. There are 50 apple trees in an orchard. Each tree produces 800 apples. For each additional tree planted in the orchard, the output per tree drops by 10 apples. How many trees should be added to the existing orchard in order to maximize the total output of trees?
 5. Find the point (x, y) on the graph of $y = \sqrt{x}$ nearest the point $(4, 0)$.