



5. A boat is pulled into a dock by a rope attached to the bow of the boat and passing through a pulley on the dock that is 1m higher than the bow of the boat. If the rope is pulled in at a rate of 1 m/s, how fast is the boat approaching the dock when it is 8m from the dock?
6. A man walks along a straight path at a speed of 4ft/s. A searchlight is located on the ground 20ft from the path and is kept focused on the man. At what rate is the searchlight rotating when the man is 15ft from the point on the path closest to the searchlight?
7. Water is leaking out of an inverted conical tank at a rate of  $10,000 \text{ cm}^3 / \text{min}$  at the same time that water is being pumped into the tank at a constant rate. The tank has a height of 6m and the diameter of the top is 4m. If the water level is rising at a rate of 20 cm/min when the height of the water is 2m, find the rate at which water is being pumped into the tank.
8. If two resistors with resistances  $R_1$  and  $R_2$  are connected in parallel, as in the figure, then the total resistance is  $R$ , measured in ohms  $\Omega$ , is given by  $\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$ . If  $R_1$  and  $R_2$  are increasing at rates of  $0.3 \Omega/\text{s}$  and  $0.2 \Omega/\text{s}$  respectively, how fast is  $R$  changing when  $R_1 = 80 \Omega$  and  $R_2 = 100 \Omega$ ?

