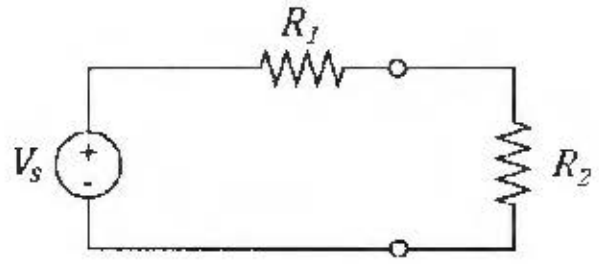
Determine the resistance R_1 such that the power dissipated in R_2 is maximum.

Vs = 12 V

R2 = 3 ohm



$$I = \frac{V_S}{R_1 + R_2} \qquad P = R_2 I^2 = \frac{R_2 V_S^2}{(R_1 + R_2)^2}$$

$$P = \frac{3.144}{(R_1 + 3)^2}$$

$$\frac{dP}{dR_1} = -2 \cdot \frac{3\,144}{(R_1+3)^3} = 0 \iff R_1 = \infty$$

↳ ALWAYS DECREASING

P_{MAX} WHEN $\boxed{R_1 = 0\,\Omega}$