Object A has a mass of 5 kg and is moving at a speed of 3 m/s. Object B has a mass of 8 kg. At what speed should B move in order to have the same momentum as A.

Given:

Mass of object A: $m_A = 5$ kg

Mass of object B: $m_B = 8$ kg

Speed of object A: $v_A = 3$ m /s

Determine: Speed of object B: v_B

Momentum of A:

$p_A = m_A \times v_A = 5 \times 3 = 15$ kg m /s ----------(1)

We want B to have the same momentum as A: Then $p_A = p_B$

$p_B = m_B \times v_B$ ----------(2)

Substituting for p_B and m_B in (2):

$15 = 8 \times v_B$

$v_B = 15 / 8 = 1.9$ m/s