Momentum ACT

A car w/ mass 1200 kg is driving north at 40 m/s, and turns east driving 30 m/s. What is the magnitude of the car's change in momentum?

A) 0 B) 12,000 C) 36,000 D) 48,000 E) 60,000

$P_{initial} = m\ v_{initial}$ = (1200 Kg) x 40 m/s = 48,000 kg m/s North

$P_{final} = m\ v_{final}$ = (1200 Kg) x 30 m/s = 36,000 kg m/s East

North-South:

$P_{final} - P_{initial}$ = (0 – 48000) = -48,000 kg m/s

East-West:

$P_{final} - P_{initial}$ = (36000 - 0) = +36,000 kg m/s

Magnitude :

$\text{Sqrt}(P^2_{North} + P^2_{East})$ = 60,000 kg m/s