MOMENTUM
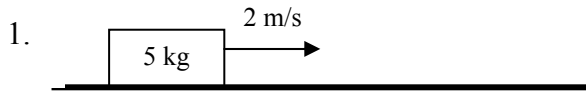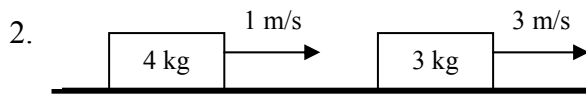## Inelastic Collisions

For all problems, assume all surfaces are frictionless.

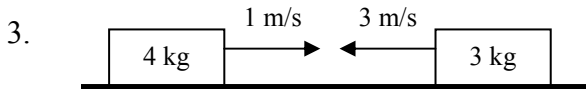I. For #'s 1-4, calculate the momentum, p = mv, of each system and each individual object.
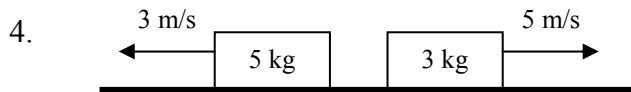
1.

2 m/s

5 kg →

p_{total} = _____

2.

1 m/s

4 kg →

3 m/s

3 kg →

p_1 = _____ p_2 = _____ p_{total} =

3.

1 m/s   3 m/s

4 kg →   ← 3 kg

p_1 = _____ p_2 = _____ p_{total} = _____

4.

3 m/s   5 m/s

← 5 kg   3 kg →

p_1 = _____ p_2 = _____ p_{total} = _____

II. For the problems below, two boxes collide and stick together (an inelastic collision). The boxes before the collision are shown on the left; the boxes after the collision are shown on the right. Solve for the indicated unknown quantities.

5.

3 m/s   At rest   v = ?

| 6 kg → | 3 kg |

| 6 kg | 3 kg → |

$p_{\text{total initial}}$ = _____
$KE_{\text{total initial}}$ = _____

$p_{\text{total final}}$ = _____ v_{total} = _____
$KE_{\text{total final}}$ = _____

6.

5 m/s   3 m/s   v = ?

| 5 kg → | 3 kg → |

| 5 kg | 3 kg → |

$p_{\text{total initial}}$ = _____
$KE_{\text{total initial}}$ = _____

$p_{\text{total final}}$ = _____ v_{total} = _____
$KE_{\text{total final}}$ = _____

7.

4 m/s   2 m/s   v = ?

| 6 kg → | ← 4 kg |

| 6 kg | 4 kg |

$p_{\text{total initial}}$ = _____
$KE_{\text{total initial}}$ = _____

$p_{\text{total final}}$ = _____ v_{total} = _____
$KE_{\text{total final}}$ = _____

8.

6 m/s   5 m/s   v = ?

| 3 kg → | ← 8 kg |

| 3 kg | 8 kg |

$p_{\text{total initial}}$ = _____
$KE_{\text{total initial}}$ = _____

$p_{\text{total final}}$ = _____ v_{total} = _____
$KE_{\text{total final}}$ = _____