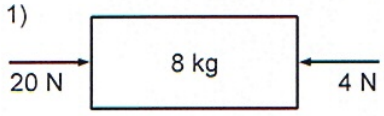
Each of the following free body diagrams represents a different problem. From the given data, solve for the missing quantities. Complete solutions for each problem should be shown (use a separate sheet if necessary).

W ← ? → E

1)



→

$F_{net} = F_1 + F_2$

$= 20N[E] + 4N[W]$ [E]

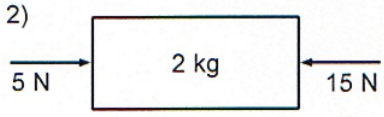
$F_{net} = 16N[E]$ ✓

$a = \frac{F_{net}}{m}$

$= \frac{16N[E]}{8kg}$ recall: $1N = 1\ kg\cdot\frac{m}{s^2}$

$a = 2.0\ m/s^2[E]$ ✓

2)



→

$F_{net} = F_1 + F_2$ [E]

$= 5N[E] + 15N[W]$

$= -10N[E]$ or

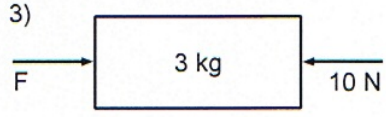
$F_{net} = 10N[W]$ ✓

$a = \frac{F_{net}}{m}$

$= \frac{10N[W]}{2kg}$

$a = 5.0\ m/s^2[W]$ ✓

3)



uniform motion ($a = 0$) do this [1st]!

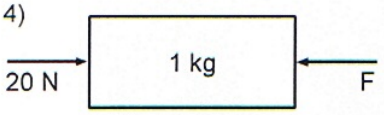
$F_{net} = 0$ cuz $F_{net} = ma$ ✓

$a = 0$ cuz uniform motion ✓

$F = 10N[E]$ ✓

recall: if $F_{net} = 0$ then the forces are balanced (i.e. equal & opposite)

4)



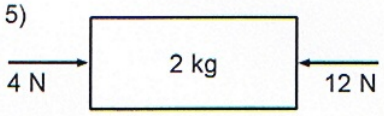
a = zero

type of motion = uniform ✓

$F_{net} = 0$ ✓

$F = 20N[W]$ ✓

5)



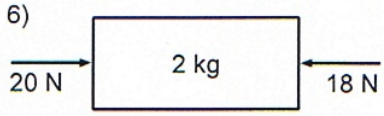
$F_{net} = 4N[E] + 12N[W]$

$F_{net} = 8N[W]$ ✓

$a = \frac{8N[W]}{2kg}$

$a = 4.0\ m/s^2[W]$ ✓

6)



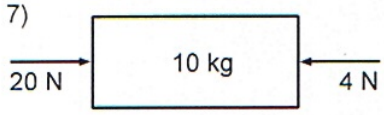
$F_{net} = 20N[E] + 18N[W]$

$F_{net} = 2N[E]$ ✓

$a = \frac{2N[E]}{2kg}$ ✓

$a = 1.0\ m/s^2[E]$

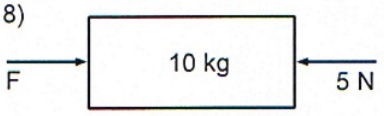
7)



F_{net} = 16N [E] ✓ 20-4

a = 1.6 m/s² [E] ✓ $\frac{16}{10}$

8)



a = 2.0 m/s² →

$F_{net} = ma = (10)(2\,[E])$

F_{net} = 20N [E] ✓

F = 25N [E] //

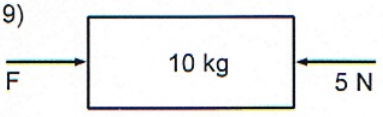
$F_{net} = F_1 + F_2$

20 [E] = F + 5 [W]

20 [E] − 5 [W] = F

20 [E] + 5 [E] = F

9)



a = 2.0 m/s² ←

F_{net} = 20N [W] ✓

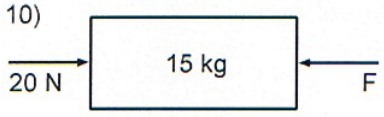
F = 15N [W] //

$F_{net} = F_1 + F_2$

20 [W] = F + 5 [W]

20 [W] − 5 [W] = F

10)



F_{net} = 7.5 N [East]

a = 0.50 m/s² [E] ✓

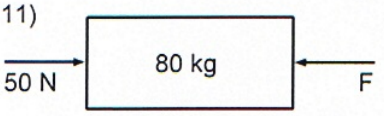
F = 12.5N [W] //

7.5 [E] = 20 [E] + F

7.5 [E] − 20 [E] = F

−12.5 [E] = F

11)



v_1 = 6 m/s [East]

v_2 = 6 m/s [West]

Δt = 4.0 s

+ [W]

$a = \frac{v_2 - v_1}{t} = \frac{6\,[W] - 6\,[E]}{4.0}$

a = 3.0 m/s² [W] //

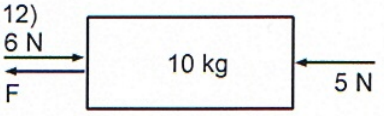
F_{net} = 240N [W] ✓

F = 290N [W] //

240 [W] = 50 [E] + F

240 [W] − 50 [E] = F

12)



a = 1.7 m/s² ←

Δt = 5.0 s

F_{net} = 17 N [W] ✓

F = 18N [W] //

17 [W] = 6 [E] + F + 5 [W]

17 [W] − 6 [E] − 5 [W] = F

Δv = 8.5 m/s [W]

$a = \frac{\Delta v}{t}$ $\Delta v = a \cdot t$ //