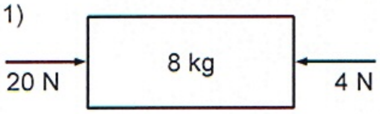
Each of the following free body diagrams represents a different problem. From the given data, solve for the missing quantities. Complete solutions for each problem should be shown (use a separate sheet if necessary).

W ← ? → E

1)



+→

$F_{net} = F_1 + F_2$

$= 20N[E] + 4N[W]$ − [E]

$F_{net} = 16N[E]$

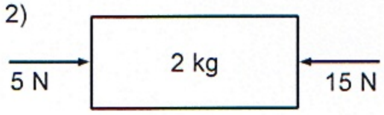
$a = \frac{F_{net}}{m}$

recall: $1N = 1\ \frac{kg \cdot m}{s^2}$

$= \frac{16N[E]}{8kg}$

$a = 2.0\ m/s^2\ [E]$

2)



+→

$F_{net} = F_1 + F_2$ − [E]

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

$= -10N[E]$ or

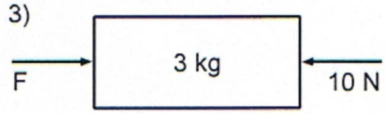
$F_{net} = 10N[W]$

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

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

$a = 5.0\ m/s^2\ [W]$

3)



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

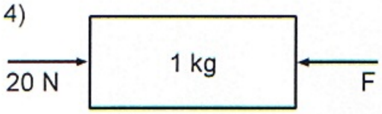
F_{net} = 0 cuz $F_{net} = ma$

a = 0 cuz uniform motion

F = 10N [E]

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

4)



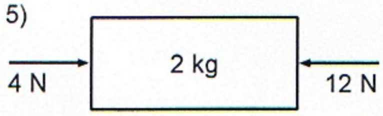
a = zero

type of motion = uniform

F_{net} = 0

F = 20N [W]

5)



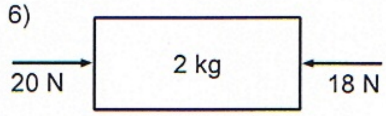
$F_{net} = 4N[E] + 12N[W]$

$F_{net} = 8N[W]$

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

$a = 4.0\ m/s^2\ [W]$

6)



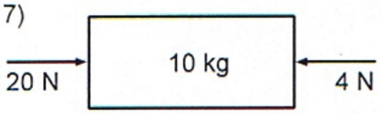
$F_{net} = 20N[E] + 18N[W]$

$F_{net} = 2N[E]$

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

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

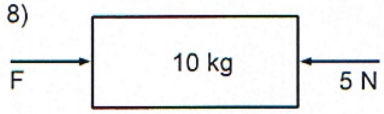
7)



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])

Fnet = 20N [E]

F = 25N [E]

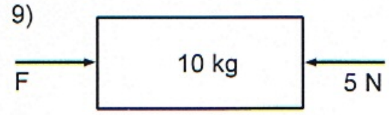
Fnet = F₁ + F₂

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]

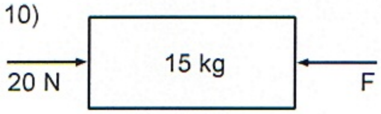
F = 15N [W]

Fnet = F₁ + F₂

20 [W] = F + 5 [W]

20 [W] − 5 [W] = F

10)



F_{net} = 7.5 N [East]

a = 0.50 m/s² [E]

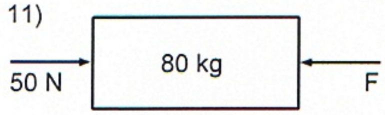
F = 12.5N [W]

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

a = $\frac{V_2 - V_1}{t}$ = $\frac{6[W] - 6[E]}{4.0}$ + [W]

a = 3.0 m/s² [W]

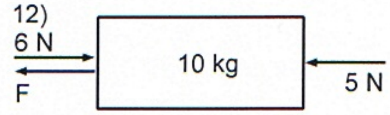
F_{net} = 240N [W]

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 = $\frac{\Delta v}{t}$ Δv = a · t