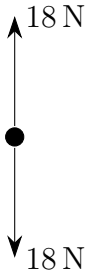
Name: Number: Date:

Newton #1 (Net Force)

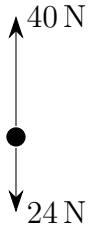
1. In each of the free-body diagrams below, calculate the **magnitude** and **direction** of the net force and draw it.

(a)



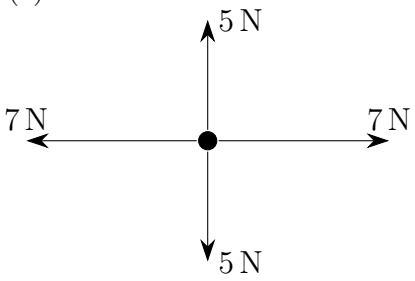
F_{NET} = _____ N, _____

(b)



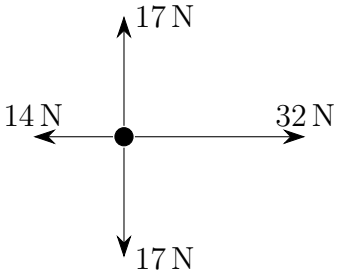
F_{NET} = _____ N, _____

(c)



F_{NET} = _____ N, _____

(d)



F_{NET} = _____ N, _____

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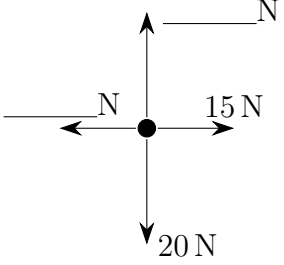
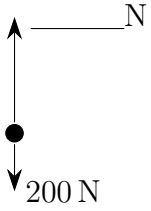
2. In each of the free-body diagrams below, the net force is given, but one or more of the applied forces is missing. Find the missing forces.

(a)



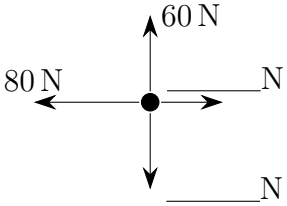
$F_{NET} = 0\,\text{N}$

(b)



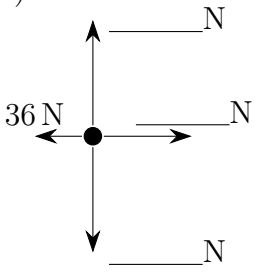
$F_{NET} = 150\,\text{N}$, up

(c)



$F_{NET} = 45\,\text{N}$, left

(d)

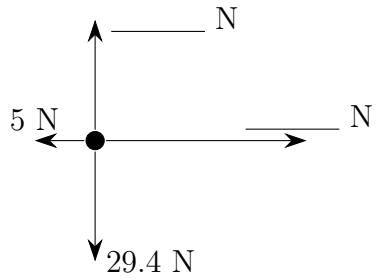


$F_{NET} = 23\,\text{N}$, right

3. What is the acceleration of a 1500-kg car that experiences a net force of 970 N?

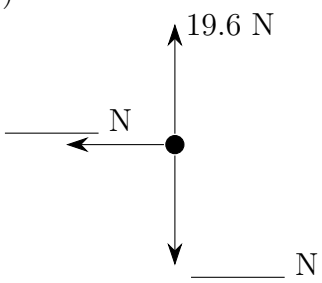
4. Fill in the blanks in each of the situations depicted below. Draw the net force.

(a)



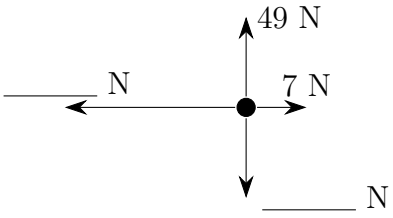
$m =$ 3 kg
$a =$ _____ m/s^2, _____
$F_{NET} =$ 23 N, right

(b)



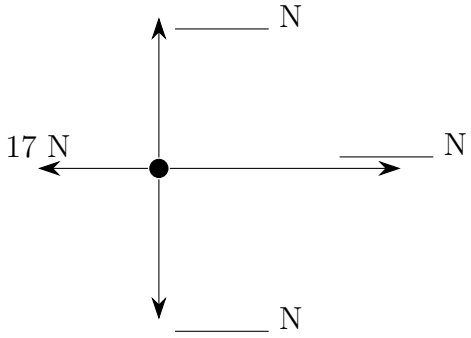
$m =$ 2 kg
$a =$ 8 m/s^2, left
$F_{NET} =$ _____ N, _____

(c)



$m =$ 5 kg
$a =$ 12 m/s^2, left
$F_{NET} =$ _____ N, _____

(d)



$m =$ 3 kg
$a =$ 18 m/s^2, right
$F_{NET} =$ _____ N, _____

5. An airplane has a mass of 2500 kg. It needs to get up to a speed of 30 m/s in order to take off. How much net force is needed to get the plane from rest up to this speed on a 245 m runway? (Hint: *Begin by finding acceleration!*)