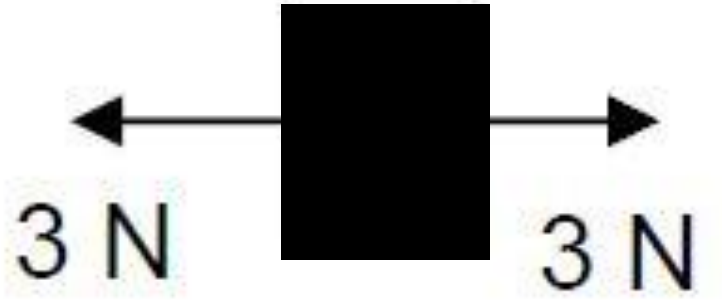
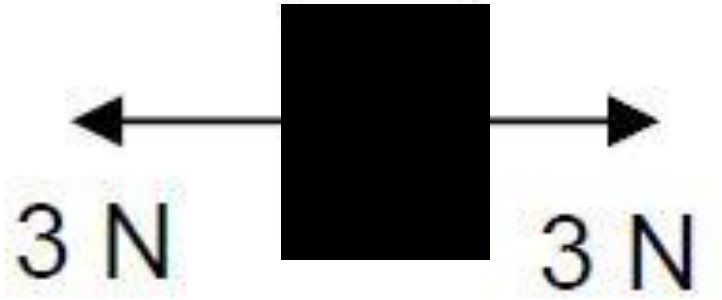
Each arrow in the diagram below represents a force acting on the box. From the information given in the diagram, find the **direction** and **magnitude** of the net force acting on the box.

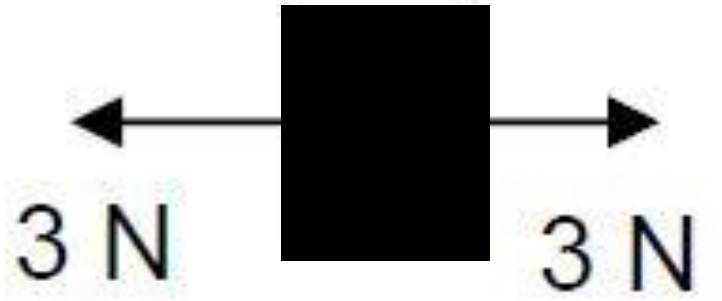


Solution:

Net force = 0 Newtons because the two forces acting on the box are equal in magnitude (size) and opposite in direction.

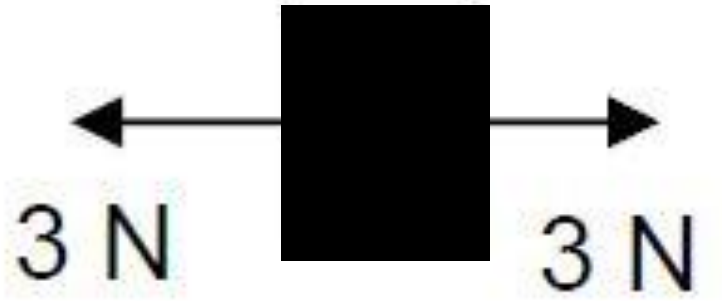


Each arrow in the diagram below represents a force acting on the box. From the information given in the diagram, find the **direction** of the **acceleration** of the box.

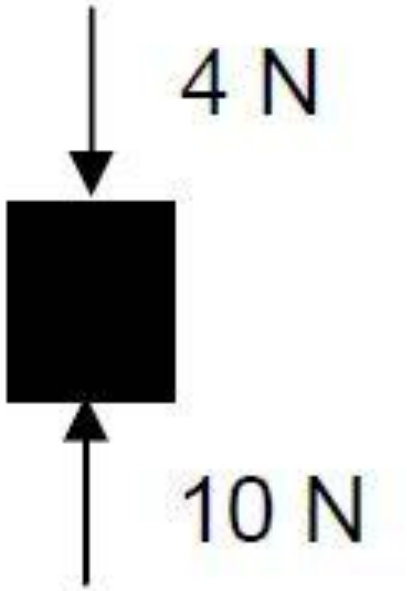


Solution:

Because the net force acting on the box is ZERO, the box will have ZERO acceleration, and so the acceleration of the box has no direction.



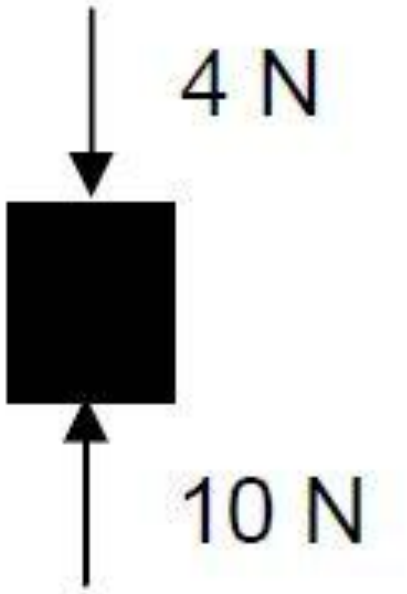
Each arrow in the diagram below represents a force acting on the box. From the information given in the diagram, find the **direction** and **magnitude** of the net force acting on the box.



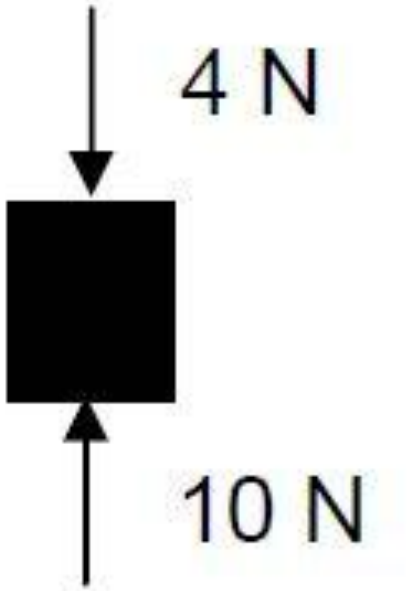
Because the two force vectors point in **opposite** directions, we find the magnitude of the net force by **subtracting** the smaller force from the larger.

10 N – 4 N = 6 N

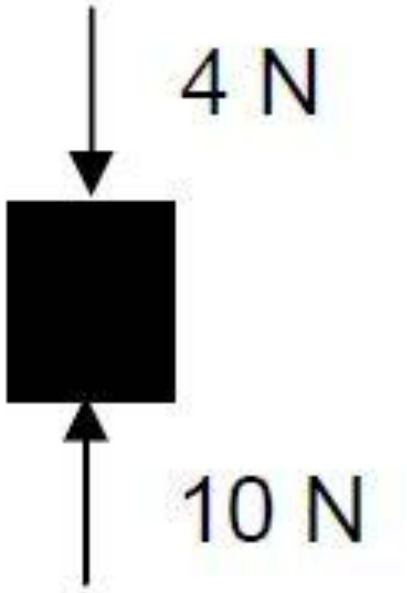
The **direction** of the net force is the same as the direction of the **larger** of the original vectors. Thus, the net force acting on the box is <u>6 Newtons up</u>.



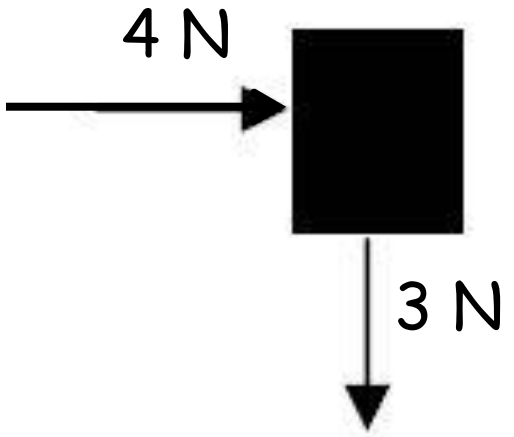
Each arrow in the diagram below represents a force acting on the box. From the information given in the diagram, find the **direction** of the **acceleration** of the box.



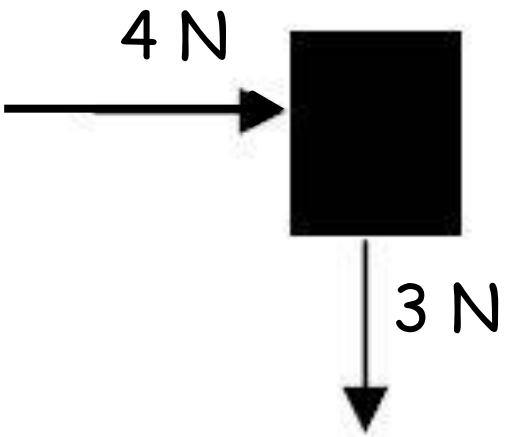
Because the **net force** acting on the box **points up**, the direction of acceleration of the box is <u>UP</u>.

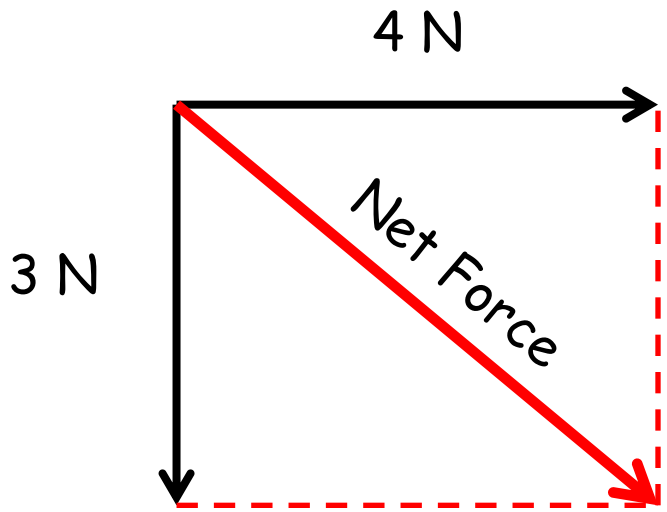


Each arrow in the diagram below represents a force acting on the box. From the information given in the diagram, find the **direction** and **magnitude** of the net force acting on the box.

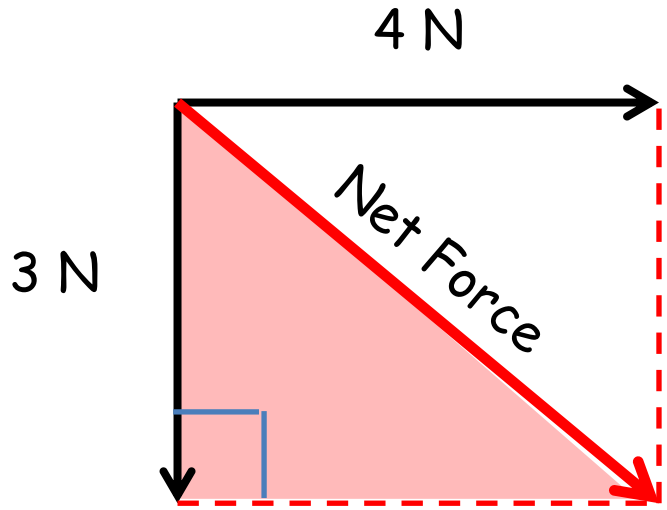


Because the force vectors are not either pointed in the same direction or opposite directions, we add them together using the Parallelogram Rule.





The area in the image below which is shaded red is a right triangle.



We know the length of two sides of the right triangle. We can use the Pythagorean Theorem to find the length of the third side.

$$A^2 + B^2 = C^2$$

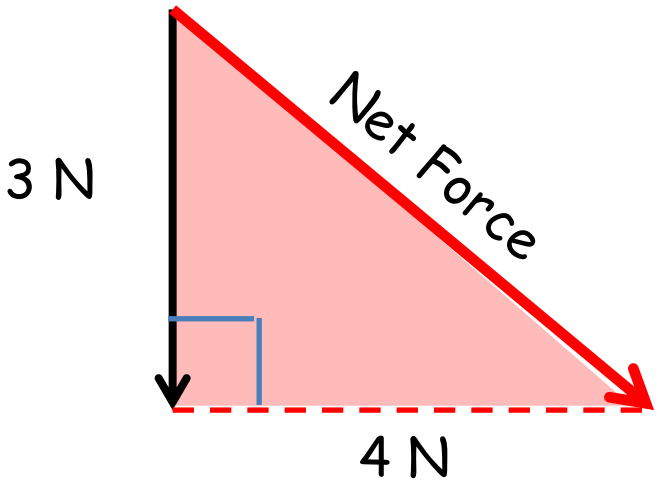
$$(4N)^2 + (3N)^2 = C^2$$

$$16N^2 + 9N^2 = C^2$$

$$\sqrt{16N^2 + 9N^2} = C$$

$$\sqrt{25N^2} = C$$

$$5N = C$$



The net force acting on the box is 5 Newtons down and to the right.

$$A^2 + B^2 = C^2$$

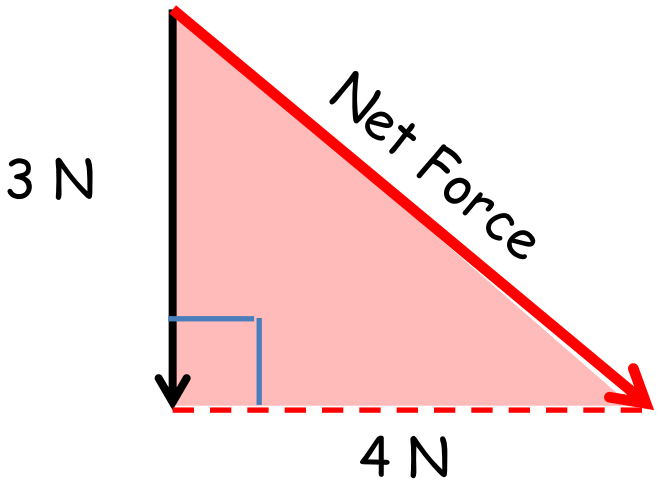
$$(4N)^2 + (3N)^2 = C^2$$

$$16N^2 + 9N^2 = C^2$$

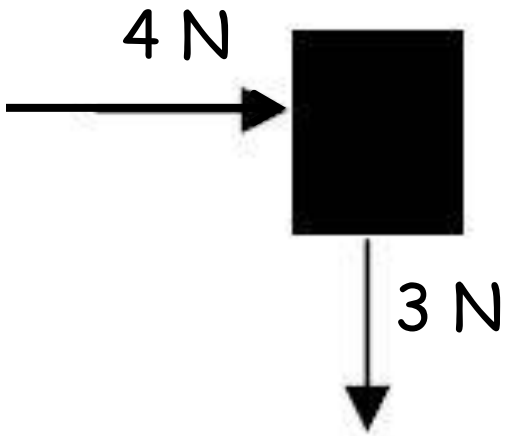
$$\sqrt{16N^2 + 9N^2} = C$$

$$\sqrt{25N^2} = C$$

$$5N = C$$



If the **mass** of the box is **2 kilograms**, what is the **acceleration** of the box? Hint: We found the **net force** acting on the box to be **5 Newtons down and to the right**.



According to Newton's 2nd Law of Motion,
net force = mass x acceleration.

So,

acceleration = net force / mass
acceleration = (5 N down and right) / 2 kilograms
acceleration = **2.5 m/s/s down and to the right**.