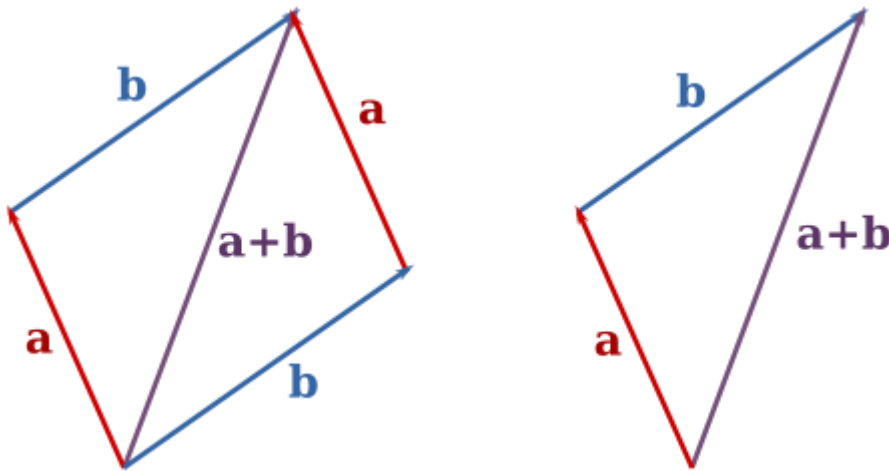


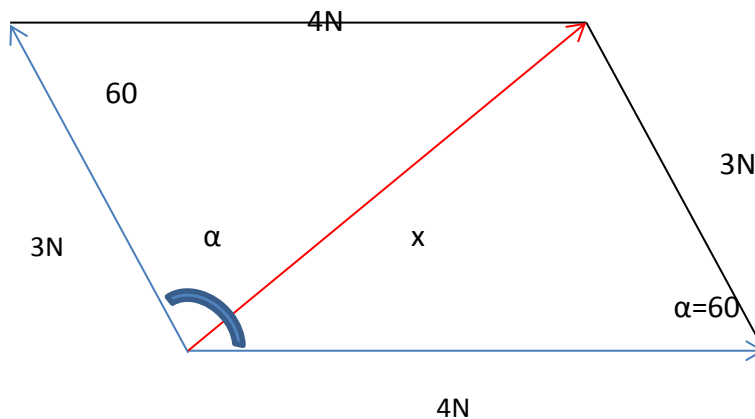
The addition of vectors a and b may be represented graphically by placing the start of the arrow b at the tip of the arrow a , and then drawing an arrow from the start of a to the tip of b . The new arrow drawn represents the vector $a + b$, as illustrated below:



This addition method is sometimes called the parallelogram rule because a and b form the sides of a parallelogram and $a + b$ is one of the diagonals. If a and b are bound vectors that have the same base point, it will also be the base point of $a + b$.

Two forces 3N and 4N are acting at an angle 120° between them. Find the resultant force in magnitude and direction.

Let's use the parallelogram rule:



Angle between forces equals 120° . Therefore angle $\alpha = 60^\circ$.

Law of cosines:

$$x^2 = 3^2 + 4^2 - 2 * 3 * 4 * \cos 60$$

$$x^2 = 25 - \frac{24}{2} = 13$$

$$x = \sqrt{13}$$

Law of sines:

$$x / \sin(60) = 4 / \sin \alpha$$

$$\sin \alpha = \frac{4}{\sqrt{13}} \frac{\sqrt{3}}{2} = 2 \sqrt{\frac{3}{13}}$$

$$\alpha = \arcsin 2 \sqrt{\frac{3}{13}} = 74$$

Answer: magnitude equals $\sqrt{13}$ and direction is 74 degrees to force 3N.