Forces of 5.28 N and 6.50 N act at right angles on a reddish-green block of mass 8.06 kg. How much acceleration occurs?

Solution

As forces of 5.28 N and 6.50 N act at right angles then the net force acting on a reddish-green block is hypotenuse of a right triangle (the legs of this triangle are forces of 5.28 N and 6.50 N).

By the Pythagorean theorem

$$F_{net} = \sqrt{5.28^2 + 6.50^2} = 8.37N.$$

By Newton's second law

$$F_{net} = ma,$$

where m – mass of block, a – its acceleration.

So

$$a = \frac{F_{net}}{m} = \frac{8.37}{8.06} = 1.04\frac{m}{s^2}.$$

Answer: $\mathbf{1.04\frac{m}{s^2}}$.