The solution for head-on collision of "hard" spheres (recast in symbolic form):

$$\mathbf{v_a} = \frac{B_a - B_b}{B_a + B_b}\mathbf{u_a} + \frac{2B_b}{B_a + B_b}\mathbf{u_b}$$

Four consequences of this solution:

1. *The quantity of motion which two hard bodies have may be increased or diminished by their collision, but when the quantity of motion in the opposite direction has been subtracted there remains always the same quantity of motion in the same direction.*
2. *The sum of the products made by multiplying the bulk of each hard body into the square of its velocity is always the same before and after collision.*
3. *A hard body at rest will receive more motion from another larger or smaller body if a third intermediately sized body is interposed than it would if struck directly, and most of all if this [third] is their mean proportional [i.e. their geometric mean].*

In all this I am thinking of bodies of the same material, or else I mean that their bulk can be assessed from their weight.

4. *A wonderful law of nature (which I can verify for spherical bodies, and which seems to be general for all whether the collision be direct or oblique and whether the bodies be hard or soft) is that the common center of gravity of two, three or more bodies always moves uniformly in the same direction in the same straight line, before and after their collision.* [tr. A. R. Hall, modified by GES]

Huygens, *Philosophical Transactions of the Royal Society,* 46, 12 April 1669, pp. 925-928.