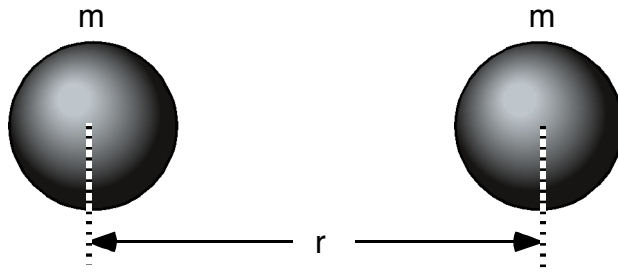


# PhyzJob: Proportional Reasoning—The Gravity Edition



1.0N

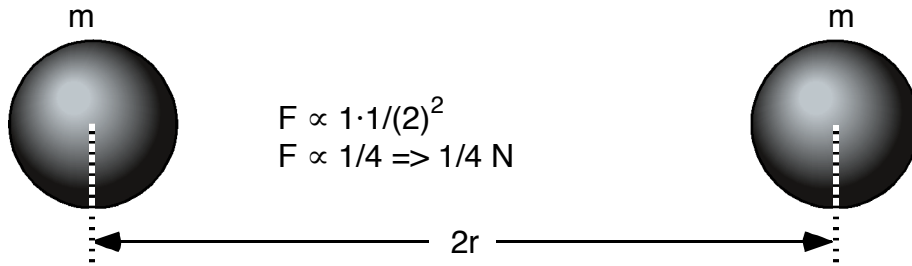


$$F \propto m_1 m_2 / r^2$$

$$F \propto m^2 / r^2 = 1\text{N}$$

The two spheres shown above attract gravitationally with one newton of force. The mass of each sphere is unknown and the distance between the spheres is unknown. But the gravitational force of attraction is one newton. Use proportional reasoning to determine the force acting on each sphere by drawing the force vectors. Show your ratio reasoning for each case.

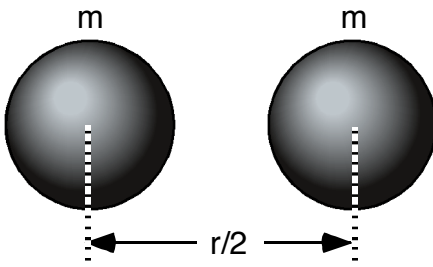
1.  
0.25 N



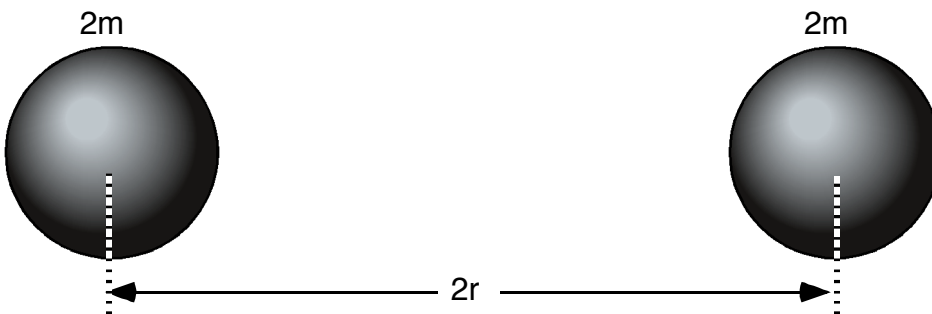
$$F \propto 1 \cdot 1 / (2)^2$$

$$F \propto 1/4 \Rightarrow 1/4 \text{ N}$$

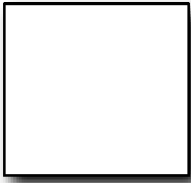
2.



3.

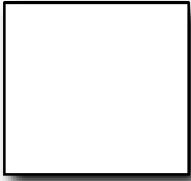


## YOU draw the diagrams



4. If the right mass is  $m/2$ , the left mass is  $m/2$ , and the distance is  $r/2$ , what is the gravitational force?

SHOW WORK:



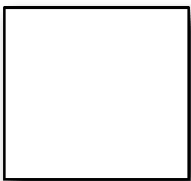
5. If the right mass is  $2m$ , the left mass is  $m/2$ , and the distance is  $r$ , what is the gravitational force?

SHOW WORK:



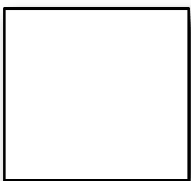
6. If the right mass is  $m$ , the left mass is  $m$ , and the distance is  $3r$ , what is the gravitational force?

SHOW WORK:



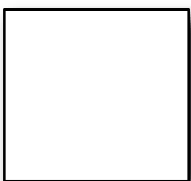
7. If the right mass is  $m/4$ , the left mass is  $m/4$ , and the distance is  $r/2$ , what is the gravitational force?

SHOW WORK:



8. If the right mass is  $4m$ , the left mass is  $4m$ , and the distance is  $r$ , what is the gravitational force?

SHOW WORK:



9. If the right mass is  $10m$ , the left mass is  $m$ , and the distance is  $5r$ , what is the gravitational force?

SHOW WORK: