

Gravitational Force Calculations (Teamwork) A Name \_\_\_\_\_

$$F = G \frac{m_1 m_2}{d^2}$$

1. Calculate the gravitational force between the Earth and the Sun

The mass of the earth is  $5.97 \times 10^{24}$  kg

The mass of the Sun is  $1.99 \times 10^{30}$  kg

The distance between the two is  $1.50 \times 10^{11}$  m

$$G = 6.67 \times 10^{-11} \frac{\text{m}^3}{\text{kg} \cdot \text{s}^2}$$

Answer to Part B

1.  $1.98 \times 10^{20}$  N (for 5 extra credit points, show that this matches the centripetal force)

Gravitational Force Calculations (Teamwork) B Name \_\_\_\_\_

$$F = G \frac{m_1 m_2}{d^2}$$

1. Calculate the gravitational force between the Earth and the moon

The mass of the earth is  $5.97 \times 10^{24}$  kg

The mass of the Moon is  $7.35 \times 10^{22}$  kg

The distance between the two is  $3.84 \times 10^8$  m

$$G = 6.67 \times 10^{-11} \frac{\text{m}^3}{\text{kg} \cdot \text{s}^2}$$

Answer to Part A

1.  $3.52 \times 10^{22}$  N ( I verified this with the centripetal force. For 5 extra credit points, and a nomination for the student of the quarter, show that the centripetal force is the same)