2. (a) The gravitational force exerted on the baby (denoted with subscript b) by the obstetrician (denoted with subscript o) is given by

$$F_{bo} = \frac{Gm_o m_b}{r_{bo}^2} = \frac{(6.67 \times 10^{-11}\,\mathrm{N{\cdot}m^2/kg^2})(70\,\mathrm{kg})(3\,\mathrm{kg})}{(1\,\mathrm{m})^2} = 1 \times 10^{-8}\ \mathrm{N}\ .$$

(b) The maximum (minimum) forces exerted by Jupiter on the baby occur when it is separated from the Earth by the shortest (longest) distance $r_{\min}$ ($r_{\max}$), respectively. Thus

$$F_{bJ}^{\max} = \frac{Gm_J m_b}{r_{\min}^2} = \frac{(6.67 \times 10^{-11}\,\mathrm{N{\cdot}m^2/kg^2})(2 \times 10^{27}\,\mathrm{kg})(3\,\mathrm{kg})}{(6 \times 10^{11}\,\mathrm{m})^2} = 1 \times 10^{-6}\ \mathrm{N}\ .$$

(c) And we obtain

$$F_{bJ}^{\min} = \frac{Gm_J m_b}{r_{\max}^2} = \frac{(6.67 \times 10^{-11}\,\mathrm{N{\cdot}m^2/kg^2})(2 \times 10^{27}\,\mathrm{kg})(3\mathrm{kg})}{(9 \times 10^{11}\,\mathrm{m})^2} = 5 \times 10^{-7}\ \mathrm{N}\ .$$

(d) No. The gravitational force exerted by Jupiter on the baby is greater than that by the obstetrician by a factor of up to $1 \times 10^{-6}\,\mathrm{N}/1 \times 10^{-8}\,\mathrm{N} = 100$.