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$$M - 5 = a - 5 \lg \left(\frac{r}{3 \cdot 10^{16}} \right) \quad (*)$$

(a) $a = -1,46$; $r = 8,14 \cdot 10^{16}$ ger

$$M - 5 = -1,46 - 5 \lg \left(\frac{8,14 \cdot 10^{16}}{3 \cdot 10^{16}} \right)$$

$$M - 5 = -3,628$$

$$M = 1,37$$

(b) Insättning av $M = 15,5$; $a = 11,1$ i (*) ger

$$\underbrace{15,5 - 5}_{10,5} = 11,1 - 5 \lg \left(\frac{r}{3 \cdot 10^{16}} \right)$$

$$5 \lg \left(\frac{r}{3 \cdot 10^{16}} \right) = 11,1 - 10,5$$

$$\lg \left(\frac{r}{3 \cdot 10^{16}} \right) = \frac{0,6}{5}$$

$$\frac{r}{3 \cdot 10^{16}} = 10^{0,12}$$

$$r = 10^{0,12} \cdot 3 \cdot 10^{16}$$

$$r = 3,95 \cdot 10^{16}$$

$$\begin{aligned} \lg x &= a \\ x &= 10^a \end{aligned}$$

Svar: (a) 1,37 (b) $3,95 \cdot 10^{16}$ m