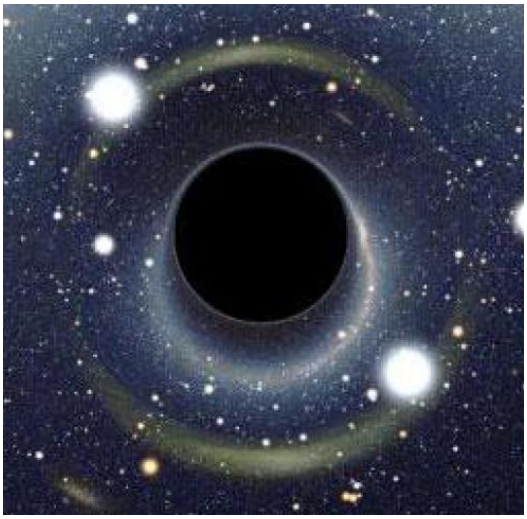
Exploring the Size and Mass of a Black Hole



Step 1: Write a linear equation in the form $y = m\,x + b$

Step 2: Predict the size of a black hole that has the mass of the planet Jupiter. (Jupiter has 318 times the mass of the Earth.)

The masses are all given in terms of the mass of our Earth:

1 Earth = 5.97×10^{24} kg (kilograms)

Example: "2.0" means a black hole that is twice the mass of the Earth:

$2 \times (5.97 \times 10^{24}$ kg) = 11.94×10^{24} kg

Mass	Radius
1.0	0.88 cm
2.0	1.76 cm
3.2	2.82 cm
5.0	4.40 cm
7.5	6.60 cm
8.7	7.76 cm
11.0	9.68 cm

NOTE: The table (left) gives the predicted radius of black holes. None of these have been directly observed, but their sizes have been determined from their masses as stated.

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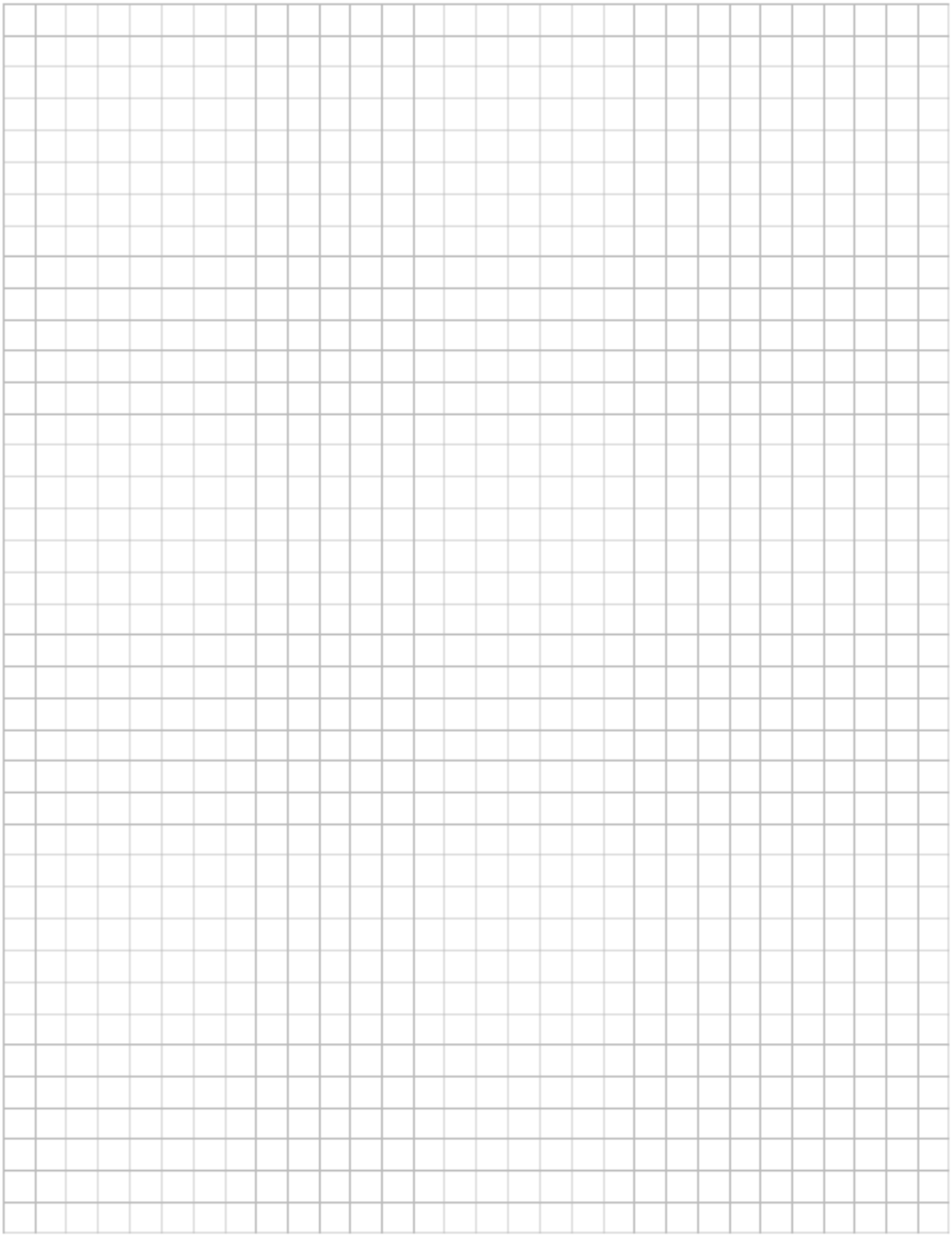
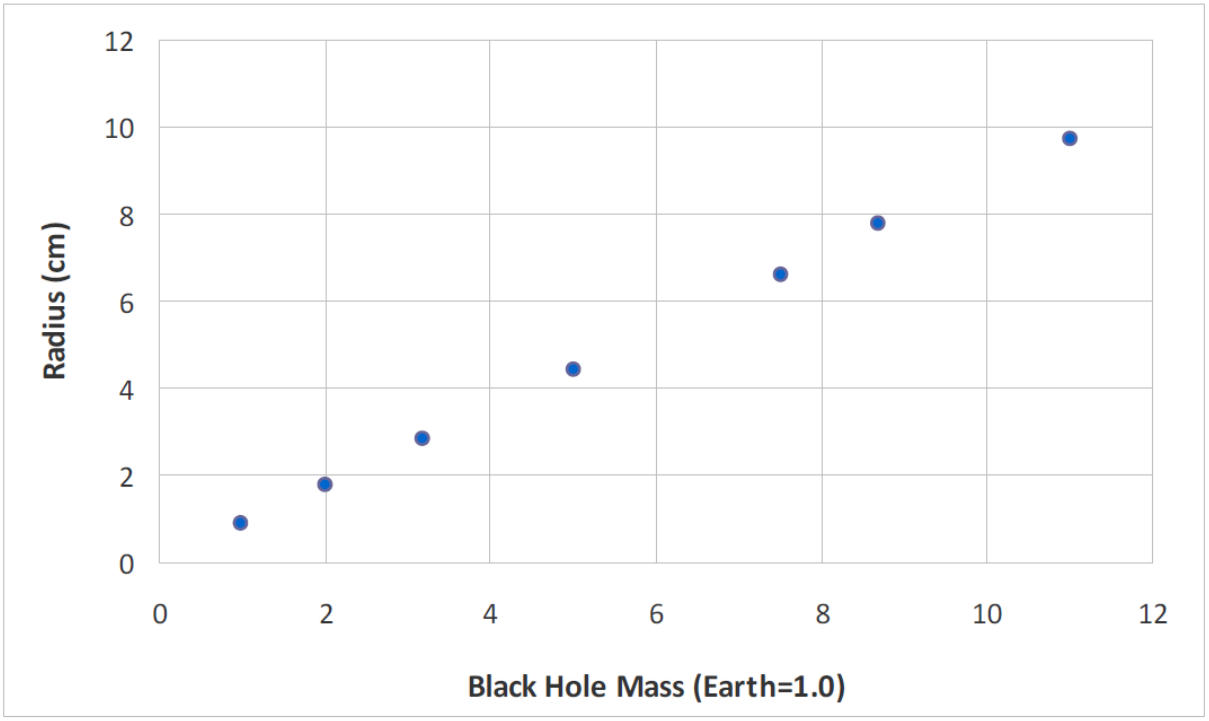


Answer Key:



Step 1: *y = 0.88 x* or *Radius = 0.88 Black Hole Mass*

Step 2: For 318 Earths, the equation becomes:

Radius = 0.88 x 318 = 280 centimeters (or 0.28 meters)