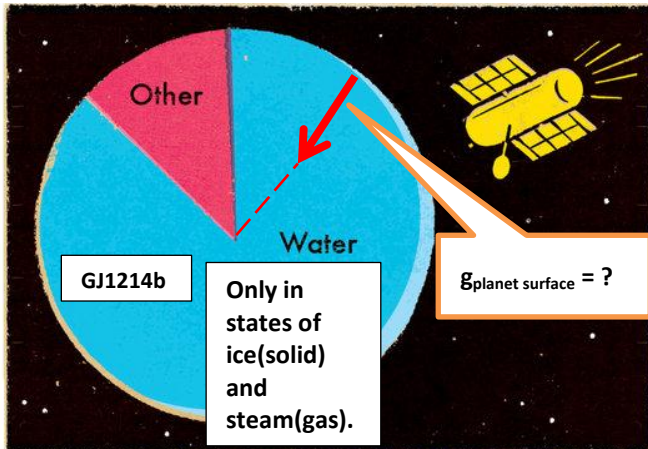


# GRAVITY

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St., Austin Tx 78701 [jpcise@austincc.edu](mailto:jpcise@austincc.edu) & NYTimes February 28, 2012 by Sindya N Bhanoo Please send Dr Cise an e-mail on how you used this application. Thanks!

## New Planet Reveals in Steam and Ice



**INTRODUCTION:** Diameter of earth  $D_{\text{earth}} = 12,756 \text{ km}$ ,

$M_{\text{earth}} = 5.9742 \times 10^{24} \text{ kg}$ , Weight =  $mg$

$= GM_{\text{planet}}/R_{\text{planet}}^2$ , Thus,  $g_{\text{planet}} = GM_{\text{planet}}/R_{\text{planet}}^2$ .

**Known parameters:** as listed below in article.....

$D_{\text{GJ1214b}} = 2.7 D_{\text{earth}}$ ,  $M_{\text{GJ1214b}} = 7 M_{\text{earth}}$

**QUESTIONS:** (a) Find  $D_{\text{GJ1214b}} = ?$  in units of Km?

(b) Find  $R_{\text{GJ1214b}} = ?$  in units of m?

(c) Find mass of GJ1214b =  $M_{\text{GJ1214b}} = ?$  in units of kg?

(d) Find acceleration of gravity ( $g_{\text{GJ1214b}}$ ) on surface of

GJ1214b ?

**ANSWERS:** (a) 34,449.3 km., (b)  $1.722 \times 10^7 \text{ m}$ .

(c)  $4.182 \times 10^{25} \text{ kg}$ , (d)  $g \sim 9.65 \text{ m/s}^2$

**Comment:** Note how close to earth's  $g(9.8 \text{ m/s}^2)$  GJ1214b's gravity at surface is????? Interesting!

**NOTE: GJ1214b is 42 light years from the earth**

Astronomers have discovered **a new planet in our galaxy** that is unlike any other found so far: **Both the planet and its atmosphere are mostly water**, though none of it is liquid. **The planet, GJ1214b, (has a diameter 2.7 times that of Earth, and it weighs(MASS) seven times as much))**. It probably has ***much more water than Earth — in the form of steam and a peculiar high-temperature ice that exists at extremely high pressures*** — and far less rock.

“There’s probably nothing too special about this planet itself,” said Zachory K. Berta, an astronomer at Harvard University who was involved with the research. The main thing, he added, is that “we have the opportunity to really see the density of the planet.” He and his colleagues report their findings in [The Astrophysical Journal](#). To estimate the density and diameter, they measured the color of the light from the star that shines through the planet’s atmosphere. “We’re observing the sunset on this planet,” he said. Though the planet was discovered with a ground-based telescope, the data that allowed Mr. Berta and his colleagues to estimate the planet’s mass and density was gathered by the [Hubble Space Telescope](#). Looking ahead, the researchers have two goals. The first is to learn more about the planet. “We’re going to study this atmosphere,” Mr. Berta said, “and work on the details so we can really try to understand what’s going on.” The second goal is to find more planets. Using the same techniques, the astronomers can study the atmosphere of other planets in detail, and Mr. Berta said a slightly smaller, slightly cooler planet might be capable of supporting life.