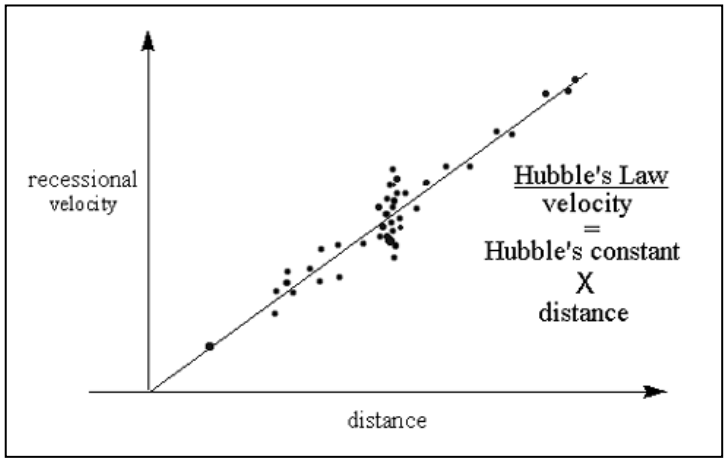
Equations with one variable II



Calculations involving a single variable come up in many different ways in astronomy. One way is through the relationship between a galaxy's speed and its distance, which is known as Hubbel's Law. Here are some more applications for you to solve!

Problem 1 – The blast wave from a solar storm traveled 150 million kilometers in 48 hours. Solve the equation 150,000,000 = 48 V to find the speed of the storm, V, in kilometers per hour.

Problem 2– A parsec equals 3.26 light years. Solve the equation 4.3 = 3.26D to find the distance to the star Alpha Centauri in parsecs, D, if its distance is 4.3 light years.

Problem 3 – Hubble's Law states that distant galaxies move away from the Milky Way, 75 kilometers/sec faster for every 1 million parsecs of distance. Solve the equation, V = 75 D to find the speed of the galaxy NGC 4261 located 41 million parsecs away

Problem 4 – Convert the temperature at the surface of the Sun, 9,900 degrees Fahrenheit to an equivalent temperature in Kelvin units, T, by using T = (F + 459) x 5/9

Problem 5 – The Andromeda Galaxy measures 3 degrees across on the sky as seen from Earth. At a distance of 2 million light years, solve for D, the diameter of this galaxy in light years: 57.3 = 6,000,000/D.

Answer Key

1 – The blast wave from a solar storm traveled 150 million kilometers in 48 hours. Solve the equation 150,000,000 = 48 V to find the speed of the storm, V, in kilometers per hour.
Answer: 150,000,000/48 = V so V = 3,125,000 kilometers/hour.

2 – A parsec equals 3.26 light years. Solve the equation 4.3 = 3.26D to find the distance to the star Alpha Centauri in parsecs, D, if its distance is 4.3 light years.
Answer: D = 4.3/3.26 = 1.3 parsecs.

3 – Hubble's Law states that distant galaxies move away from the Milky Way, 75 kilometers/sec faster for every 1 million parsecs of distance. V = 75 x D. Solve the equation to find the speed of the galaxy NGC 4261 located D = 41 million parsecs away
Answer: V = 75 x 41 so V = 3,075 kilometers/sec.

4 – Convert the temperature at the surface of the sun, 9,900 degrees Fahrenheit (F) to an equivalent temperature in Kelvin units, T, by using T = (F + 459) x 5/9
Answer: T = (F + 459) x 5/9 so T = (9,900 + 459) x 5/9 = 5,755 Kelvins

5 – The Andromeda Galaxy measures 3 degrees across on the sky as seen from Earth. At a distance of 2 million light years, solve for D, the diameter of this galaxy in light years: 57.3 = 6,000,000/D.
Answer: D = 6,000,000/57.3 so D = 104,700 light years in diameter.