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Cancer

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CANCER

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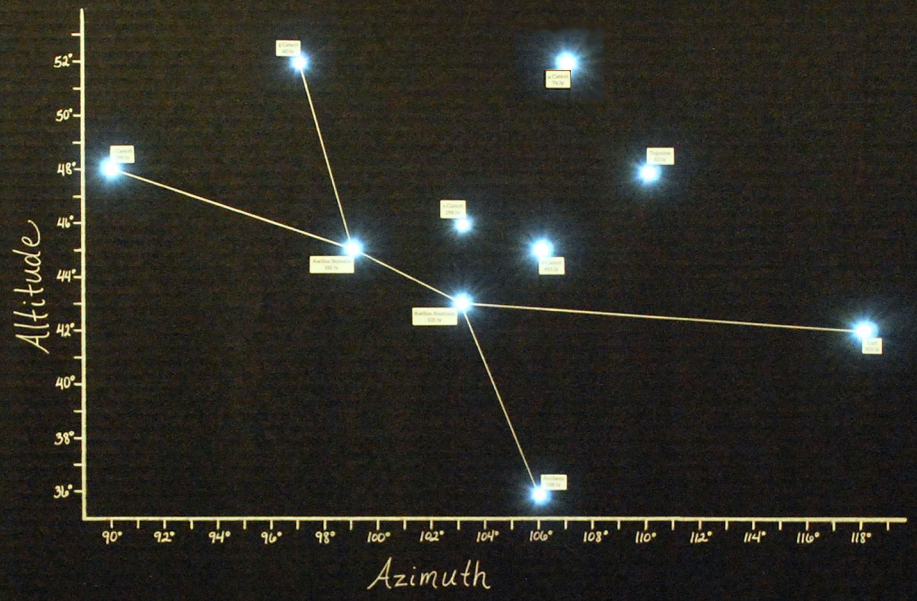
Introduction

This project considers the constellation Cancer with its 10 brightest stars and its Messier objects. Cancer the crab is a zodiac constellation located between Leo and Gemini. In part one, I recorded the names of the ten brightest stars in Cancer, described the two Messier objects in Cancer, and calculated how many days are in a year per the rise times of a star in Cancer. In part two, I recorded the distance and spectral type of the ten brightest stars in Cancer. I also created a graph of the ten stars. In part three, I recorded the masses and calculated the main sequence lifetime, the completed lifetime, and the remaining lifetime along with the fates of the stars and what order they will die in. The end goal of this project is to be able to identify the major stars in different constellations and determine what their lifetimes will look like.

Spatial Relationship of Stars

Six of the stars form the asterism for the crab which looks like two Ys connected end to end at the bottom. The stars have a range of distances of 355 lightyears, so they all are not near each other. Eta Cancri and Iota Cancri both have distances of 298 lightyears, but they are about 13° apart. They are not near each other. Tegmine and Mu Cancri have a difference of 7 lightyears and they are only 5° apart. These are the two stars that are closet together. M44 is between Asellus Borealis, Asellus Australis, and Eta Cancri. M67 is located just to the top right of Acubens. M44 has distance of 577 lightyears and M67 is 2,700 lightyears away. They are both beyond these ten stars in Cancer.



Mythology

While Hercules was on his second labor fighting the Hydra, the jealous Juno sent Cancer the crab to harass Hercules by nipping at his heels. Hercules crushed the crab, but Juno put Cancer in the heavens as a reward for its service.

Messier Objects

M44

M44 and M67 are both open star clusters that form inside interstellar clouds. A few thousand stars form at once to create an open star cluster. M44 (Praesepe) is 577 lightyears away. Praesepe has been known since at least 260 BC when the Greek poet and philosopher Aratus wrote a poem about Praesepe the Manger. M67 is 2,700 lightyears away. M67 was discovered in 1779 by a German astronomer named Johann Gottfried Koehler.

M67

Star Data Table

Star Name	Spectral Type	Mass	Main Sequence Lifetime	Completed Lifetime	Remaining Lifetime	Death Order	Fate of Stellar Core
Acubens	A5V	1.9	2,770,000,000 years	none	3,050,000,000 years	8	white dwarf
Tarf	K4III	2.7	1,370,000,000 years	1,370,000,000 years	137,000,000 years	4	white dwarf
Asellus Borealis	A1IV	4.8	434,000,000 years	434,000,000 years	43,400,000 years	2	white dwarf
Asellus Australis	K0III	2.3	1,890,000,000 years	1,890,000,000 years	189,000,000 years	6	white dwarf
Tegmine	G0V	1.1	8,260,000,000 years	none	9,090,000,000 years	10	white dwarf
η Cancri	K3III	2.6	1,480,000,000 years	1,480,000,000 years	148,000,000 years	5	white dwarf
θ Cancri	K5III	2.8	1,280,000,000 years	1,280,000,000 years	128,000,000 years	3	white dwarf
ι Cancri	G8Iab	5.9	287,000,000 years	316,000,000 years	2,870,000 years	1	white dwarf
μ Cancri	G2IV	1.4	5,100,000,000 years	5,100,000,000 years	510,000,000 years	7	white dwarf
χ Cancri	F6V	1.3	5,920,000,000 years	none	6,510,000,000 years	9	white dwarf

Evolution of Three Stars

Name	Spectral Type	Mass	Stages Completed	Completed Lifetimes	Remaining Stages	Remaining Lifetimes	Fate of Stellar Core	Mass Range
ι Cancri	G8Iab	5.9	Main Sequence, RGB, HB	316,000,000 years	Supergiant	2,870,000 years	Planetary nebula White dwarf	Under 1.4 solar masses
Tarf	K4III	2.7	Main Sequence	1,370,000,000 years	RGB, HB, AGB	137,000,000 years	Planetary nebula White dwarf	Under 1.4 solar masses
Tegmine	G0V	1.1	None	None	Main Sequence, RGB, HB, AGB	9,090,000,000 years	Planetary nebula White dwarf	Under 1.4 solar masses

Length of Year Calculations

The stars in the night sky will rise earlier each night than the one before it. Therefore, constellations will be in different parts of the sky during different times of the year. Over the course of one year, the stars will make a complete circle around the night sky and return to its original location. With this information, I can calculate how many days are in a year. I calculated the average change in rise time per day for the star Tarf which is 3.93 minutes. Then I took the number of minutes in a day which is 1,440 and divided it by 3.93. I calculated there to be 366.41 days in a year. The exact number of days in a year is 365.2422. This means that my percent error is 0.32%.

Works Cited

Bell, Cathy. "Cancer." The Mythology of the Constellations: Cancer. www.comfychair.org/~cmbell/myth/cancer.html. Accessed 10 Apr. 2017.

"M44." La bitácora de Galileo. www.bitacoradegalileo.com/2010/10/28/m44-el-cumulo-del-pesebre-praesepe/. Accessed 10 Apr. 2017.

"Messier 44: Beehive Cluster." Messier Objects. 15 May 2015. www.messier-objects.com/messier-44-beehive-cluster/. Accessed 10 Apr. 2017.

"Messier 67 - M67 - Open Cluster." Freestarcharts.com. freestarcharts.com/messier-67. Accessed 10 Apr. 2017.

"Open Cluster M67." ELATE observatory - Velimir Popov - Astroimages. www.elateobservatory.com/www.ELATEOBSERVATORY.com/main%20pages/secondary%20pages/third%20pages/astronomy%20html/0055_a/M67_a_m.html. Accessed 10 Apr. 2017.

Tennant, Catherine. "Cancer." Zodiac Constellations - from the Box of Stars. www.interactivestars.com/the_box_of_stars/constellation.php?zodiac=cancer. Accessed 11 Apr. 2017.