

Walk through of sample getGHA() calculation:

Given

Sighting
body: Betelgeuse
date: 17-Jan-16
time: 03:15:42

getGHA()

A. Find the angular displacement of the star relative to Aries.

1. Locate the observed body in the star table for the date of the observation.

The star table lists the positions of the primary navigable stars in three-day increments. Our observations is 1/17/16, which falls between 1/16/16 and 1/19/16. Choose the earliest of the days: 1/16/16. The entry for that day is:

Betelgeuse	1/16/16	270°59.1	7°24.3
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2. Let latitude be the star's declination obtained from the table.

latitude = 7°24.3

Interpretation: If we sighted Betelgeuse directly overhead on this date, we would have to be at latitude 7°24.3.

3. Let SHA_{star} be the Sidereal Hour Angle obtained from the table.

shaStar = 270°59.1

Interpretation: This star is located 270°59.1 away from a specific reference point. In other words, we would see Betelgeuse if we were to face the first point of Aries and rotate clockwise 270°59.1.

B. Find the Greenwich Hour Angle of Aries for the date and time of the observation.

1. Locate the table entry for the Greenwich Hour Angle (GHA) of Aries for the date and hour of the observation.

The day of the observation is 1/17/16 and the hour is 03. The relevant entry in the Aries table is:

1/17/16	3	160°59.1
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2. Let GHA_{Aries1} be the Greenwich Hour Angle of Aries for the date and hour of the observation.

GHA_{Aries1} = 160°59.1

3. Locate the table entry for the Greenwich Hour Angle (GHA) of Aries for the date and hour+1 of the observation.

We are looking for a date of 1/17/16 and an hour of 04. The relevant entry in the Aries table is:

1/17/16	4	176°01.5
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4. Let GHA_{Aries2} be the Greenwich Hour Angle of Aries for the date and hour+1 of the observation.

GHA_{Aries2} = 176°01.5

5. Interpolate GHA_{Aries} as $(\text{GHA}_{\text{Aries1}} + |\text{GHA}_{\text{Aries2}} - \text{GHA}_{\text{Aries1}}| * (s/3600))$, where s is the number of seconds past the hour of the observation.

GHA_{Aries1} = 160°59.1

GHA_{Aries2} = 176°01.5

s = 942

GHA_{Aries} = 164°55.2

Interpretation: The table only provides the GHA of Aries at the top of each hour. We are adding approximating Aries' location by adjusting the angular distance based on amount of time past the hour of the observation.

C. Calculate the star's GHA

1. Let GHA_{observation} be the GHA of Aries + SHA of the star

GHA _{observation}	=	GHA _{Aries}	+	SHA _{star}
	=	164°55.2	+	270°59.1
	=	435°54.3		

2. Clean

mod GHA_{observation} by 360 if necessary and round to nearest 0.1

GHA_{observation} = 75°54.3

3. Return GAH and latitude

return	75°54.3	7°24.3
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