

## NOVEMBER NOEMA SKY GUIDE

### Pegasus

Pegasus is a constellation visible in the north during spring. It depicts the winged horse, Pegasus, who, in one version of the Greek myth, sprang from the neck of Medusa after she was beheaded. It is easily recognised by the 'Great Square of Pegasus', which is made up of three bright stars in Pegasus and a bright star in the neighbouring constellation of Andromeda. To see the Great Square and Pegasus, look towards the northern horizon after 10pm. The most northeastern star is Alpha-Andromedae, and the remaining three stars are in the Pegasus constellation.

This region of the sky holds a particularly interesting deep space object called Einstein's Cross, which is a gravitationally lensed quasar. With the exception of a few explosions, quasars are the brightest objects in the universe. Scientists aren't entirely sure what they are, but they are extremely remote and let off huge amounts of energy, most likely fuelled by super massive black holes.

This quasar lies directly behind a galaxy, so it would normally be blocked from our view. However, the galaxy creates such a strong gravitational field that it bends light from the quasar, allowing ghost images to be seen. Pictured on the cover, this quasar is called Einstein's Cross, because up to four images of the quasar are visible, a phenomena predicted by Einstein in his general theory of relativity.



### Transit of Mercury

Mercury transits the Sun about 13 times each century, and this year, on 12 November, we will be able to witness this again.

A planetary transit is when a planet moves between the Earth and the Sun, making its silhouette visible on the Sun's disc. The inner planets, Mercury and Venus, are the only ones that can undertake solar transits, because they are the only planets that orbit between Earth and the Sun. The first transit to be observed was in 1631, when both Mercury and Venus transited within a month of each other. These transits became important to astronomers, because when viewed from different locations on earth, the data could be used to calculate the distance between Earth and the Sun. This distance is known as one astronomical unit (AU), and enabled astronomers to learn more about the size of the cosmos. Captain Cook observed the transit of Mercury in 1769 when first visiting New Zealand, after witnessing Venus' transit in Tahiti a few months earlier.

It is dangerous to stare directly at the Sun for any length of time, so, to watch this transit, you need proper equipment such as a solar telescope. There will also be a live feed of the transit online through the Mercury Rising Project, which aims to bring people together to witness this rare event. Learn more at [www.mercuryrisingproject.com](http://www.mercuryrisingproject.com)

### Remember a moment in time with a personalised star chart from Otago Museum!

Each chart shows the position of stars, constellations, planets, and the Sun, and the phase of the Moon for the exact time, date, and location of your special event.

Save 10% on your chart by enjoying a show in the Perpetual Guardian Planetarium while you wait!

Place your order at the Museum Shop.

## THE SKY TONIGHT TE ĀHUA O TE RAKI I TĒNEI PŌ



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## MOON MARAMA PHASES



Phase	Date
First Quarter	Monday 4 November
Full Moon	Wednesday 13 November
Third Quarter	Wednesday 20 November
New Moon	Wednesday 27 November

## NOVEMBER NOEMA 2019



## SUN RĀ RISE / SUNSET

Date	Rise	Set
Friday 1 November	6.16am	8.27pm
Friday 15 November	5.57am	8.48pm
Saturday 30 November	5.44am	9.08pm

## PLANETS WHETŪ AO

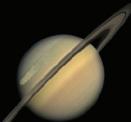
### Jupiter Hine-i-tiweka



1 November before 11.42pm  
15 November before 10.59pm  
30 November before 10.15pm

In Ophiuchus

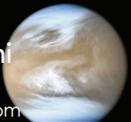
### Saturn Pareārau



1 November before 1.14am  
15 November before 12.23am  
30 November before 11.29pm

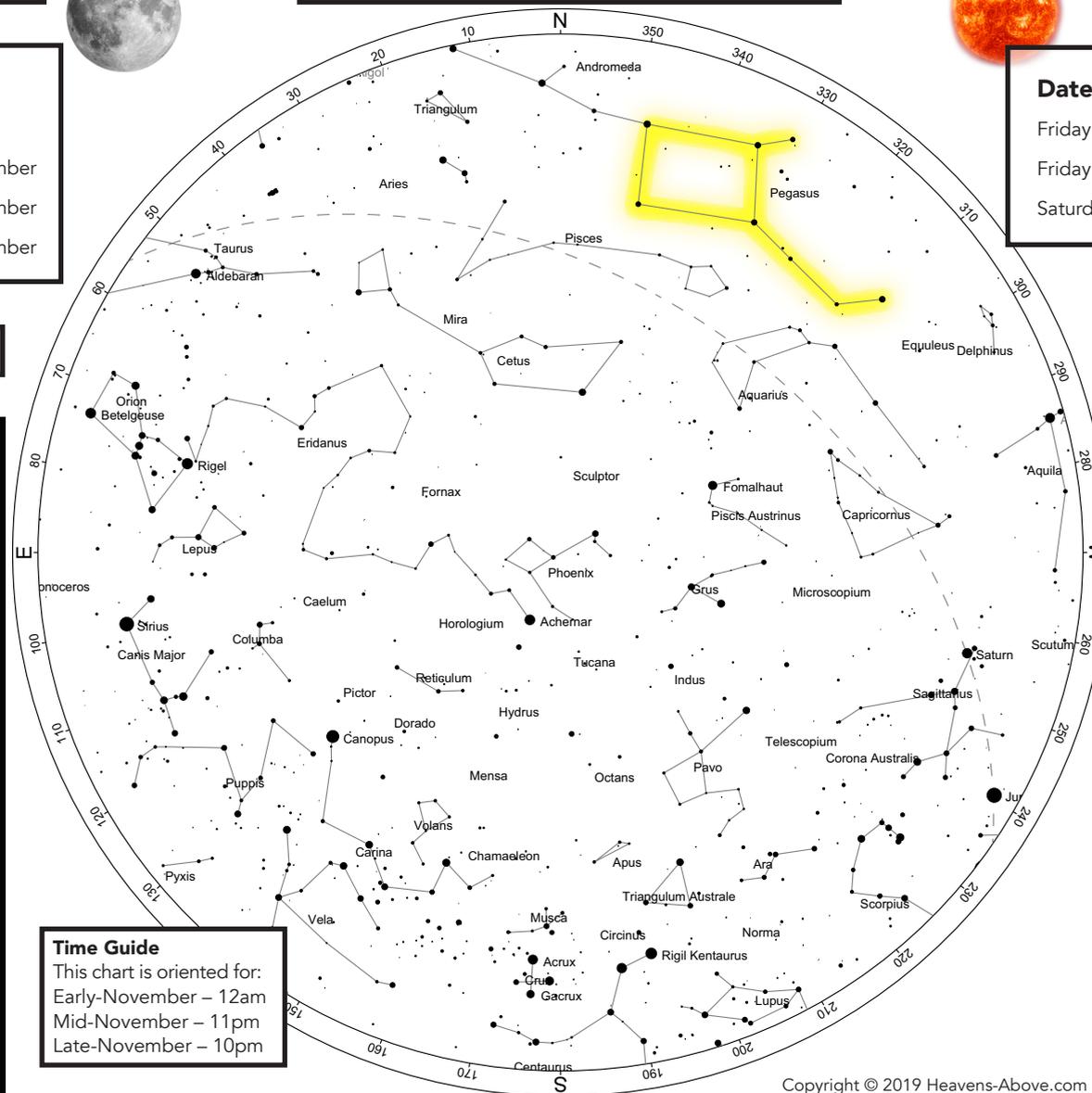
In Sagittarius

### Venus Meremere-tū-ahiahi



1 November before 9.47pm  
15 November before 10.20pm  
30 November before 10.48pm

In Ophiuchus



**Time Guide**  
This chart is oriented for:  
Early-November – 12am  
Mid-November – 11pm  
Late-November – 10pm

**How to use this chart:** Hold the chart up to the sky and rotate it, so the direction you are looking matches the direction printed on the bottom. For example, if you are looking south, place 'S' at the lower edge. Stars rise in the east and set in the west like the sun. As the Earth turns, the sky appears to rotate clockwise around the south celestial pole. The sky makes a small shift to the west every night, as the Earth rotates around the sun.

## CONJUNCTION OF VENUS AND JUPITER

Venus and Jupiter will spend this month slowly approaching each other until they reach conjunction on 24 November. A conjunction is an apparent meeting, or passing, of celestial bodies in the sky as seen from Earth. Of course, while Venus and Jupiter will look close together from our vantage point, Jupiter will still be more than seven times further away from Earth than Venus.

Conjunctions between these two planets are particularly stunning, as they are the second and third brightest objects in the night sky after the Moon. To see this conjunction, go out after 10pm and look to the west. You should see two bright celestial objects very near each other. The higher and more southern object is Venus, while the lower and more northern object is Jupiter.