

Ponder the Portage County Skies with Paul

Sky events for October 2008

- 01 Sunrise @ 6:56 am, Azimuth 94°**
- 01 sunset @ 6:37 pm, Azimuth 266°**
- 04 Sputnik 1 launched (1957)**
- 04 World Space Week begins**
- 05 Mercury in inferior conjunction**
- 07 1st Quarter Moon @ 4:04 am**
- 14 Full Moon @ 3:02 pm**
- 21 Third Quarter Moon 6:55 am**
- 21 Orionid meteor shower**
- 22 Mercury at greatest morning elongation**
- 22 The first record of a solar eclipse (2136 BC)**
- 22 Orionid meteor shower**
- 26 Venus passes 3° north of Antares**
- 27 Moon passes 7° south of Mercury pre-dawn**
- 28 New Moon @ 6:14 pm**
- 31 Sunrise @ 7:34 am, Azimuth 109°**
- 31 Sunset 5:48 pm, Azimuth 250°**

What are the celestial highlights for October?

The two brightest planets Jupiter (magnitude -2.2) and Venus (magnitude -3.9) are evening planets. Jupiter sets Oct. 1st at around 11:30 pm but by the end of Oct. sets around 9:30 pm. Whereas Venus sets around 7:30 pm at the start of the month and around 7 pm at the end of the month. The pre-dawn planets of Saturn (magnitude 1) and Mercury (magnitude -0.9) have similar stories. Saturn rises about 5 am to start the month and about 3 am at months end. Mercury rises about the same time from the 10th through the end of the month (about 6:30 am), but the note above how the sun rises 38 minutes later at the end of the month.

Why do Jupiter & Saturn each differ by 2 hours during the month, but Venus and Mercury do not? When I put the solar system on the ceiling of my classroom, I need only move the terrestrial four planets throughout the school year as the outer gas planets take so much longer to orbit the sun that they hardly appear to move. Since the Earth orbits the Sun 360 degrees in about 360 days, that works out to be about 1 degree per day or 30 degrees per month. Since the Earth spins on its axis 360 degrees in 24 hours, that works out to be 15 degrees per hour (60 minutes), which makes 1 degree equal 4 minutes. So now the 30 degrees per month times 4 minutes per degree becomes 120 minutes per month or 2 hours per month. In a nutshell, this means that the stars and the far away gas planets, like Jupiter & Saturn, appear to change their position in the sky by 2

hours west per month because of the Earth moving 30 degrees East around the Sun each month.

How good will the Orionid meteor shower be at peak on the morning of the 22nd? Note a 3rd quarter moon means the moon rises at midnight and is on the meridian (highest an object gets in the sky) at sunrise so the moon will wash out 2/3 of the shower. At a dark site you may see as many as ten shooting stars per hour.

Do you have any good stories about

Sputnik? In the movie October Skies they show a scene where they observe Sputnik pass over the sky. What they were really seeing was the last stage of the rocket in orbit, as Sputnik was only the size of a softball making it too small to reflect enough light from the sun to see it.

What does Azimuth mean? Azimuth is your position on the horizon where due north is zero degrees or 360 degrees making due east 90 degrees, south 180 degrees, and west 270 degrees. Note the sun rises 4 degrees south of due east and sets 4 degrees south of due west to start the month and increases to about 20 degrees by months end as the sun falls in the sky to match the season.

What kind of mathematics is used to keep track of all data for NASA missions or for Astronomers to keep track of all objects in the Universe? Large amounts of data are stored in databases. Databases use a mathematics called matrices. Matrices are simply rows and columns of data. Since every row has a number associated with it and every column another number, the data can be controlled mathematically using matrix properties. The Internet, movie computer magic, anything that requires large amounts of data to be manipulated quickly by a computer uses matrix mathematics.

Is there any mathematical number system of which matrices is a subset? No, to my knowledge, matrices are the most powerful mathematical number system we know of. Ask any actuary and they will tell you that matrices are the bread and butter of our mathematical universe.

An example where one of your students used matrices? One group brought a vase from home and used matrices to find an equation that fit the curve of the vase. Now that they had the equation to fit the curve of the vase, they could use calculus to determine the volume of the vase. Using matrices make this a simple task. GNATS