HOW MUCH DO YOU KNOW ABOUT SATURN?

Use the Saturn Data Chart below to answer these questions and increase your numeric knowledge of Saturn, its rings, and its distance from the Earth.

Please use a separate sheet of paper for your answers.

1. How many Saturn days occur during one Earth day?

2. Arrange the rings in order of distance from Saturn.
   - Which ring is the closest to Saturn?
   - Which ring is the farthest from Saturn?
   - Which ring is the widest?
   - Which ring is the narrowest?

3. Calculate the distance between the orbits of Earth and Saturn.

SATURN DATA CHART

Planet	Day Length	Mean Orbit
Earth	23 hours 56 minutes	149,589,262 km
Saturn	10 hours 14 minutes	1,426,666,422 km
Ring - Named alphabetically in the order discovered	**Radii** (km) - Measured from planet center to start of ring	**Width (km)**
A	122,050-136,770	14,600
B	91,980-117,580	25,500
C	74,490-91,980	17,500
D	66,970-74,490	7500
E	180,000-480,000	300,000
F	140,224	30-500
G	166,000-174,000	8000

4. Calculate the mean circumference of each ring. How long would it take a spacecraft traveling at 56,000 km/hr to go around each ring?

5. Traveling at the speed of light, radio transmissions from the Cassini spacecraft take between 1 hour 14 minutes and 1 hour 24 minutes to get to Earth. (The transmission time changes, based on the distance between planets as they move in their orbits.) About how long would it take for mission controllers to know if a command was executed properly, after it was sent to Cassini?

ANSWER KEY (Hey! No cheating.)

1. Earth Day: 23 hr 56 min = 23.93 hr
   Saturn Day: 10 hr 14 min = 10.23 hr
2. 1,426,666,422 km (Saturn's mean orbit) - 149,589,262 km (Earth's mean orbit) = 1,277,077,160 km
   23.93 hr/10.23 hr = 2.34 Saturn days per each Earth day
3. (Nearest to farthest) D C B A F G E
   Nearest ring: D; **Farthest ring:** E; **Widest ring:** E; **Narrowest ring:** F
4. Mean Circumference: Add both radii and divide by 2 for mean radius, then multiply by pi (3.14). **Travel time around each ring:**
   Divide circumference (km) by 56,000 (km/hr).
   (For individual results, see Results by Ring table on the right)
5. Double the time; the transmission would have to travel to Cassini and back. The time would be between 2 hr 28 min and 2 hr 48 min.

Results by Ring (for Question #4)

Ring	Mean Circumference Rounded to nearest km	Time to Travel in Spacecraft Rounded to nearest hour
D	222,092	4
C	261,358	5
B	329,009	6
A	406,347	7
F	440,303	8
G	533,800	10
E	1,036,200	19

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