

How long are the (solar) days on Mercury and Venus?

NAME _____ DATE _____

A planet's *year* is how long it takes that planet to orbit the Sun. A planet's *solar day*, more commonly called its *day*, is the time from noon to noon on that planet. For example, one *Earth year* is 365 Earth days, while one *Mars year* is 687 Earth days (669 *Mars days*). Let's work out how long the solar days are on the slowly spinning planets Mercury and Venus.

In Figure 1, Mercury is shown in six positions in its orbit. Mercury orbits the Sun counterclockwise about once every 90 Earth days. Mercury spins 360° counterclockwise on its axis once every 60 Earth days. That is, the *sidereal day* on Mercury is 60 Earth days long.

1. On Earth day 0, Mercury is at position A. What Earth day is it when Mercury is at positions B through G? (G is the same as A, but one orbit later.) Write those numbers on Fig. 1.

2. At each position, draw in Mercury's terminator (the line between night and day). Then shade the night side of the planet. We have already done this for you at position F.

3. On Mercury in position A we have drawn a mountain. You know how long Mercury takes to spin around 360 degrees, so at each position in Mercury's orbit, draw in the mountain.

4. What time is it on the mountain at each position in Mercury's orbit? (Position G is the same as position A, but one orbit later.) We have filled in position A for you: A: noon

B: _____ C: _____ D: _____ E: _____ F: _____ G: _____

5. Based on the above, one day on Mercury is ____ Mercury years long (_____ Earth days).

In Figure 2, Venus is shown in eight positions in its orbit. Venus orbits the Sun counterclockwise about once every 240 Earth days. Venus spins 360° CLOCKWISE on its axis once every 240 Earth days as well. That is, the *sidereal day* on Venus is 240 Earth days long.

6. At each position in its orbit, draw Venus' terminator, shade in its night side (see position F), and write in the number of the Earth day on which Venus will be at that position.

7. On Venus in position A we have drawn a mountain. You know how long Venus takes to spin around 360 degrees, so at each position in Venus's orbit, draw in the mountain.

8. What time is it on the mountain at each position in Venus's orbit? (Position I is the same as position A, but one orbit later.) We have filled in position A for you: A: noon

B: _____ C: _____ D: _____ E: _____ F: _____ G: _____ H: _____ I: _____

9. Based on the above, one day on Venus is ____ Venus years long (_____ Earth days).

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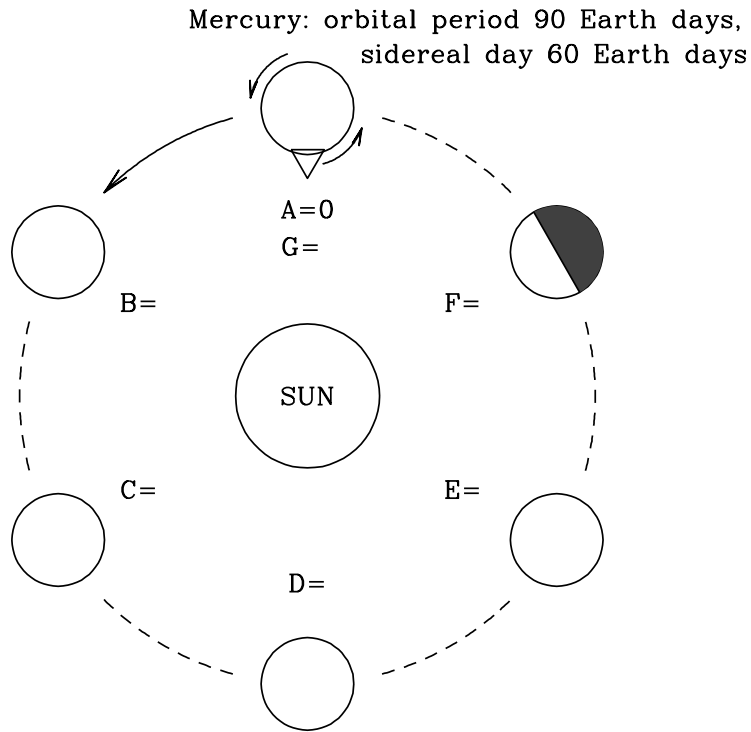


Fig. 1.— ABOVE: Mercury at six positions in its orbit around the Sun.

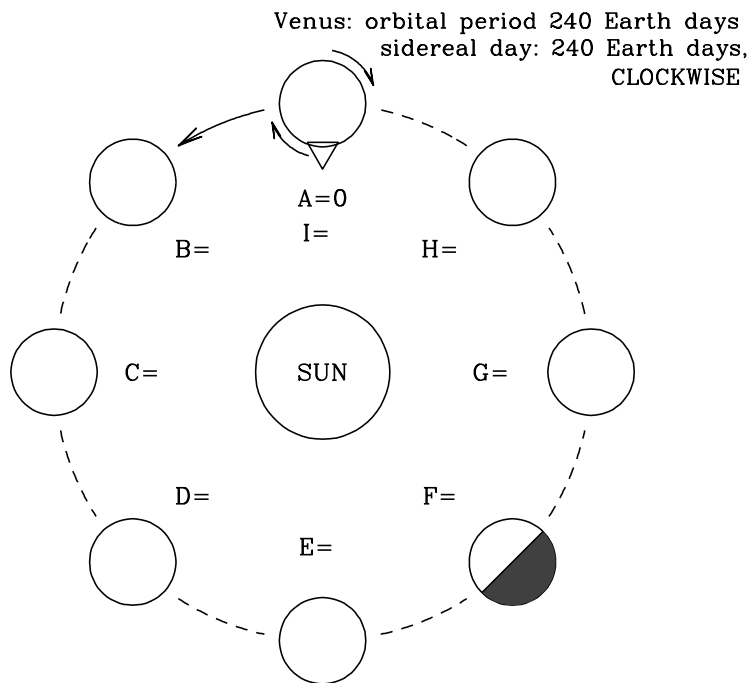


Fig. 2.— Venus at eight positions in its orbit around the Sun.