Planetary Orbit Simulator – Pretest

Answer the following questions.

Question 1: Which of the following is not part of Kepler's contribution to planetary orbits?

a) shapes of the orbit
b) speeds of planets in their orbit
c) orbital period
d) gravity

Question 2: Rank the following 4 ellipses below in order of increasing ellipticity.

A, B, C, D
B, A, D, C
C, D, B, A
D, C, B, A

Question 3: Which of the following look most like the orbit of Venus?

a)

b)
Question 4: At which point or points is the planet slowing down? (planets shown here are assumed to be orbiting counter-clockwise)

a) A, E  
b) B, C, D  
c) D  
d) A, B, C, D, E  
e) none of the points (the planet is moving at constant speed)

Question 5: With respect to the figure above, which of the following statements is true?

a) The planet will cover regions A and B is the same amount of time because of Kepler’s 2nd Law.
b) The planet will cover region A in a faster amount of time than region B, because A has less area.

c) The planet will take longer to move through region A because it is moving slower in region A than it is in region B.

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Question 6: Using the graph, a planet with a semimajor axis of 10 will have an orbital period of about

a) 4.6 years  

b) 10 years  

c) 32 years  

d) 100 years  

Question 7: The orbital period of Mars is

a) longer than earth's orbital period because it is farther from the sun.  

b) shorter than earth's orbital period because it is farther from the sun.  

c) longer than the earth's orbital period because its orbit is less circular.  

d) shorter than the earth's orbital period because its orbit is more circular.  

Question 8: The acceleration of a planet is

a) directly opposite the planet's motion if it is slowing down.  

b) in the same direction of the planet's motion if it is speeding up.  

c) always towards the sun.  

d) always away from the sun.
Question 9: If the arrows depicted in the picture represent velocity, which planet or planets is shown correctly? (Planets can be orbiting either clockwise or counterclockwise.)
   a) A  
   b) C  
   c) D  
   d) B, E

Question 10: If a planet has a semimajor axis of 4 and an eccentricity of 0.2, how far is the planet at aphelion?
   a) 0.8  
   b) 3.2  
   c) 3.8  
   d) 4.2  
   e) 4.8  
   f) 20