NEXT-TIME QUESTION

The spaceship at S wishes to touch the surface of the giant planet and proceed to point X in the shortest distance possible. To what point P on the planet surface should the spaceship travel?
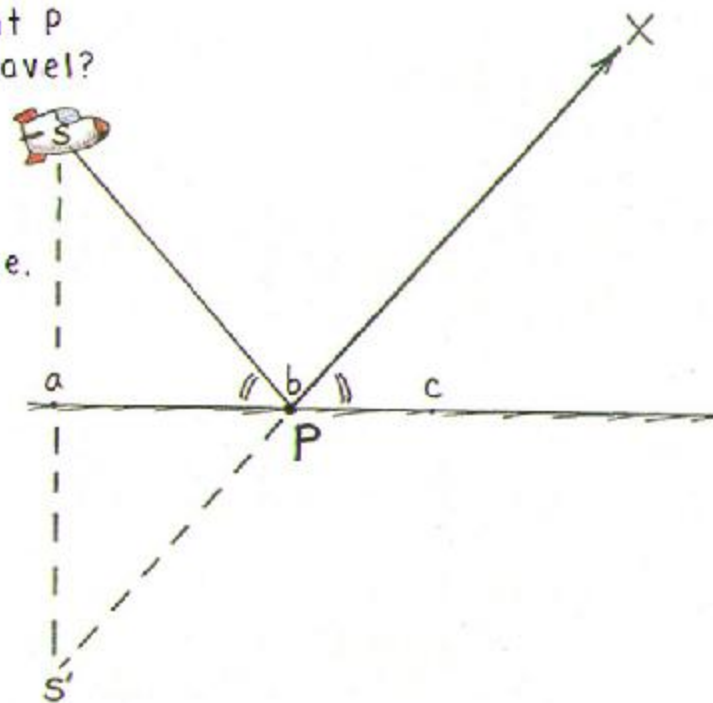
X

S

a) Point a.

b) Point b.

c) Point c.

a   b   c

d) Actually, all yield the same total distance.

the shortest distance possible. To what point P
on the planet surface should the spaceship travel?

a) Point a.
b) Point b.
c) Point c.
d) Actually, all yield the same total distance.

Answer: c. Point c

The spaceship should first travel to
Point b. Create a reflection of S below
the planet surface and call it S'. Then
the distance SPX equals S'PX, which will
be the shortest when S'PX is a straight
line. Can you see that P is the point
wherein SP and PX make the same angle with the ground?

This idea was formulated by the French scientist Pierre de Fermat in about 1650,
and is called Fermat's principle of least time. But the idea goes even further back,
to Hero of Alexandria in the first century A.D. From this we get the law of
reflection: *The angle of incidence equals the angle of reflection.*

CONCEPTUAL **Physics**

ARBOR SCIENTIFIC
TOOLS THAT TEACH.

© 2000 Paul G. Hewitt