Name: **Date:**

Problem-Based Task: Radio Interference

SMP	
1 ✓	2 ✓
3	4 ✓
5 ✓	6 ✓
7 ✓	8 ✓

In the mountains, where the direct line of sight is frequently interrupted by the geography, radio contact is maintained through the use of Near Vertical Incidence Skywaves (NVIS), a type of radio system that bounces a signal off the ionosphere to get between receivers. However, these signals are susceptible to interference from large flying objects such as airplanes and helicopters.

Suppose that one transmitter/receiver pair is 40 km apart, and that a small airplane passes through the signal line twice as it flies over the mountains. The flight path of the plane is a parabola with an a-value of $-\frac{1}{324}$. The plane reaches its highest point of flight 44 km directly below the radio reflection point at 23:00 hours, when its ground speed is about 3 km/minute. If an important message is scheduled to broadcast from 23:00 hours to 23:10 hours, should the transmission time be changed? If so, how? (Note: The height of the ionosphere above the surface of the earth is about 50 km, and the angle of the radio wave with respect to the ionosphere is the same for incoming waves and reflected waves.)

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