Answer on Question#55028 - Physics - Astronomy - Astrophysics

If we detected radio signals of intelligent origin from the Andromeda Galaxy (M31) and immediately responded with a radio message of our own, how long would we have to wait for a reply?

Solution:

Since the Andromeda Galaxy is $l = 2.52 \times 10^6 \text{ly}$ away, it'll take $\tau = 2.52 \times 10^6 \text{years}$ for radio signal to reach the galaxy and the same amount of time to come back. Therefore the total time of waiting is

$$t = 2\tau = 5.04 \times 10^6 \text{years}$$

Answer: $5.04 \times 10^6 \text{years}.$