Plots of 1-D charge and field distributions. The density of a volume charge in a region in free space depends on the Cartesian coordinate x only. Which of the following combinations of the two periodic functions $f_1(x)$ and $f_2(x)$ shown in Fig.Q1.13 can represent $\rho(x)$ and the associated electric field intensity, $E(x)$, in this region?

(A) $\rho(x) = f_1(x)$ and $E(x) = f_2(x)$.
(B) $\rho(x) = f_2(x)$ and $E(x) = f_1(x)$.
(C) $\rho(x) = f_1(x)$ and $E(x) = cf_2(x)$, where c is a constant
(D) $\rho(x) = f_2(x)$ and $E(x) = cf_2(x)$, where c is a constant
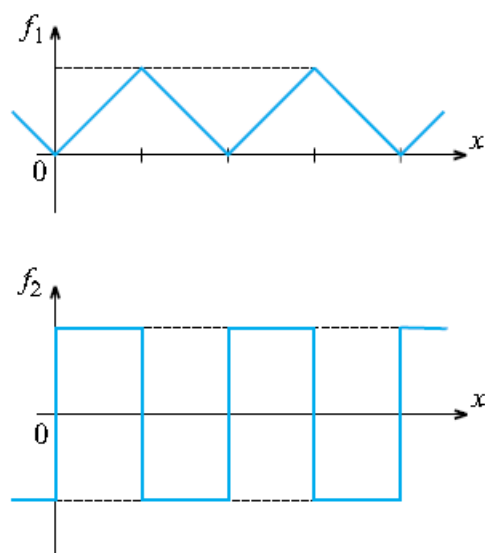(E) None of the above combinations is possible.

Figure Q1.13 Two periodic functions of the Cartesian coordinate x in space; for Question 1.19.

Solution: (B)
Answer: (B)