Previous Year Problem with Solution

Three randomly chosen non-negative integers x, y and z are found to satisfy the equation $x+y+z=10$. Then the probability that z is even, is **(2017 Adv.)**

(a) $\frac{1}{2}$ (b) $\frac{36}{55}$ (c) $\frac{6}{11}$ (d) $\frac{5}{11}$

Sample space $\rightarrow {}^{12}C_2$

Number of possibilities for z is even.

$$z=0 \Rightarrow {}^{11}C_1$$
$$z=2 \Rightarrow {}^{9}C_1$$
$$z=4 \Rightarrow {}^{7}C_1$$
$$z=6 \Rightarrow {}^{5}C_1$$
$$z=8 \Rightarrow {}^{3}C_1$$
$$z=10 \Rightarrow {}^{1}C_1$$

$$\text{Total} = 36$$

$$\therefore \text{ Probability} = \frac{36}{66} = \frac{6}{11}$$