

$$\therefore F(M) = F(x_p + \frac{1}{2}, y_p + 1)$$

$$\therefore F(M) = A(x_p + \frac{1}{2}) + B(y_p + 1) + c$$

$$\begin{aligned}\therefore F(M_N) &= F(x_p + \frac{1}{2}, y_p + 2) \\ &= A(x_p + \frac{1}{2}) + B(y_p + 2) + c\end{aligned}$$

$$\begin{aligned}\therefore F(M_{NE}) &= F(x_p + \frac{3}{2}, y_p + 2) \\ &= A(x_p + \frac{3}{2}) + B(y_p + 2) + c\end{aligned}$$

We know,

$$\begin{aligned}d_{init} &= F(M) - F(P) \\ &= A(x_p + \frac{1}{2}) + B(y_p + 1) + c - Ax_p - By_p - c \\ &= Ax_p + \frac{A}{2} + By_p + B + c - Ax_p - By_p - c \\ &= \frac{A}{2} + B \\ &= dy/2 - dx \quad [\because A = dy \text{ and } B = -dx]\end{aligned}$$

$$\begin{aligned}\text{Again, } d_N &= F(M_N) - F(M) \\ &= A(x_p + \frac{1}{2}) + B(y_p + 2) + c - A(x_p + \frac{1}{2}) - B(y_p + 1) - c \\ &= By_p + 2B - By_p - B \\ &= B \\ &= -dx \quad [\because -dx = B]\end{aligned}$$

$$\begin{aligned}\text{And, } d_{NE} &= F(M_{NE}) - F(M) \\ &= A(x_p + \frac{3}{2}) + B(y_p + 2) + c - A(x_p + \frac{1}{2}) - B(y_p + 1) - c \\ &= Ax_p + \frac{3A}{2} + By_p + 2B - Ax_p - \frac{A}{2} - By_p - B \\ &= A + B\end{aligned}$$

$$= dy - dx \quad [\because A = dy \text{ and } B = -dx]$$