

Both sides are not compatible, so this case is not possible.

Case 3:  $p = 6k_1 + 1$   $q = 6k_2 + 5$   $r = 6k_3 + 1$

$$q = p + d \Rightarrow 6k_2 + 5 = (6k_1 + 1) + d \Rightarrow d = 6(k_2 - k_1) + 4$$

$$r = p + 2d \Rightarrow 6k_3 + 1 = 6k_1 + 1 + 12(k_2 - k_1) + 8$$

$$= 6(2k_2 - k_1 + 1) + 3$$

(Both sides are not compatible, so this case is not possible)

Case 4:  $p = 6k_1 + 1$   $q = 6k_2 + 5$   $r = 6k_3 + 5$

$$q = p + d \Rightarrow 6k_2 + 5 = (6k_1 + 1) + d \Rightarrow d = 6(k_2 - k_1) + 4$$

$$r = p + 2d \Rightarrow 6k_3 + 5 = (6k_1 + 1) + 12(k_2 - k_1) + 8$$

$$= 6(2k_2 - k_1 + 1) + 3$$

(Both sides are not compatible, so this case is not possible)

Case 5:  $p = 6k_1 + 5$   $q = 6k_2 + 1$   $r = 6k_3 + 1$

$$q = p + d \Rightarrow 6k_2 + 1 = 6k_1 + 5 + d \Rightarrow \boxed{6(k_2 - k_1 - 1) + 2} = d$$

$$r = p + 2d \Rightarrow 6k_3 + 1 = (6k_1 + 5) + 12(k_2 - k_1 - 1) + 4$$

$$= 6(2k_2 - k_1 - 2 + 1) + 3 = 6(2k_2 - k_1 - 1) + 3$$

(Both sides are not compatible, so this case is not possible)

Case 6:  $p = 6k_1 + 5$   $q = 6k_2 + 1$   $r = 6k_3 + 5$

$$q = p + d \Rightarrow 6k_2 + 1 = 6k_1 + 5 + d \Rightarrow 6(k_2 - k_1 - 1) + 2 = d$$

$$r = p + 2d \Rightarrow 6k_3 + 5 = 6k_1 + 5 + 12(k_2 - k_1 - 1) + 4 = 6(2k_2 - k_1 - 2 + 1) + 3$$

(Both sides are not compatible, so this case is not possible)

Case 7:  $p = 6k_1 + 5$   $q = 6k_2 + 5$   $r = 6k_3 + 1$

$$q = p + d \Rightarrow d = 6(k_1 - k_2)$$

$$r = p + 2d \Rightarrow 6k_3 + 1 = 6k_1 + 5 + 12(k_1 - k_2)$$

(Not possible)  $= 6(2k_1 - k_2) + 5$