

کلاس: دهم دفتر B

تکلیف شماره: 14

موضوع: هندسه

1. الف) $\frac{1}{r}, 1, r, \dots \rightarrow q = r$ $a = \frac{1}{r}$ $t_{10} = aq^9$ $\frac{1}{r} \times r^9 = r^8 = \underline{256}$

ب) $a_{17} = aq^{16}$ $a_{13} = aq^{12}$ $\frac{a_{17}}{a_{13}} = \frac{aq^{16}}{aq^{12}} = q^4 = r^4 = \underline{16}$

ج) $a_4 = aq^3 = \frac{1}{r} \times r^3 = 8$ $a_{10} = aq^9 = \frac{1}{r} \times r^9 = 256$ $\frac{256 + 8}{r} = \underline{13}$

د) $a_n = 128 = a \times q^{n-1}$ $256 = r^{n-1} = r^8 \Rightarrow \underline{n = 9}$

2. $a_5 = aq^4 = 12$ $a_8 = aq^7 = 96$ $\frac{a_8}{a_5} = \frac{aq^7}{aq^4} = \frac{96}{12} = q^3 = 8 \Rightarrow q = 2$
 $a \times r^4 = 12$ $a = \frac{12}{r^4} = \frac{3}{r}$
 $a_{10} = aq^9 = \frac{3}{r} \times r^9 = 3 \times r^8 = \underline{3 \times 256}$

3. الف) $a_1 \times a_1 q \times a_1 q^2 \times a_1 q^3 \times a_1 q^4 = a_1^5 \times q^{10} = 256 = 2^8 = (a_1 q^2)^5 \Rightarrow a_1 q^2 = \underline{2}$
 $a_3 = aq^2 = \underline{2}$

ب) $a_1 \times a_5 = a_1 \times a_1 q^4 = a_1^2 q^4 = (a_1 q^2)^2 = 2^2 = \underline{4}$

4. $r^a, \sqrt{r^b}, r^b$ $\frac{r^{\frac{\Delta}{r}}}{r^a} = \frac{r^b}{r^{\frac{\Delta}{r}}} = q = r^{\frac{\Delta}{r} - a} = r^{b - \frac{\Delta}{r}} \Rightarrow \frac{\Delta}{r} - a = b - \frac{\Delta}{r}$
 $\frac{\Delta}{r} = \frac{1}{r} \Rightarrow r^{\frac{\Delta}{r}} = r^{\frac{1}{r}}$
 $\frac{a+b}{r} = \frac{0}{r} = \underline{\frac{1}{r}}$

5. $a_3 = aq^2 = 1-x$ $a_7 = aq^6 = x$ $a_{11} = aq^{10} = x+1$
 $a_3 a_{11} = a_7^2$ $(1-x)(1+x) = x^2 \Rightarrow 1-x^2 = x^2$ $1 = 2x^2$ $\frac{1}{2} = x^2$ $x = \pm \sqrt{\frac{1}{2}}$

$$a + aq^r = r \quad a(1 + q^r) = r \quad aq + aq^r = aq(1 + q) = r$$

$$(1+q)(1-q+q^r)$$

$$\frac{a(1+q)(1-q+q^r)}{aq(1+q)} = \frac{r}{r} = \frac{1-q+q^r}{q} \Rightarrow r \cdot q = 1 - q + q^r$$

$$\Sigma aq = 1 + q^r$$

$$\Sigma aq + 1 + q^r = r \quad \Sigma q(1 - r \cdot q) = 1 - r \cdot \Sigma \Rightarrow q = r \Rightarrow ar = 1 \Rightarrow arq^r = 1 \times r^r = \underline{r^r}$$

$$a \otimes a q = 1^{\otimes} \quad a \otimes a q = 1^{\otimes} = a^{\otimes} q^{\otimes} \Rightarrow a q = \sqrt{2} \quad a = \sqrt{2}, 1^{\otimes} \quad a = 1^{\otimes}, \sqrt{2} = 1^{\otimes}$$

$S_n = a_1 \left(\frac{q^n - 1}{q - 1} \right)$ $q = r = \frac{c}{r}$ $a_1 = r$ $r \left(\frac{r^{10} - 1}{r - 1} \right) = r^{10} - 1$ الف-١

$r \times r \times r \times r \times r \times r \times r \times r \times r \times r \dots \times \underbrace{r \times r}_{r \times r^9}^{n-1} \Rightarrow r^{10} \times r^{\frac{9 \times 10}{r}} = r^{10} \times r^{\Sigma \Delta}$ ب

$$S_n = a + (n-1)d + a + (n-2)d + a + (n-3)d + \dots + a + d + a \quad \text{(الف) - ب}$$

$$S_n = a + a + d + \dots + a + (n-2)d + a + (n-1)d$$

$$\therefore S_n - \cancel{a} + (n-1)d + \cancel{a} + (n-1)d + \dots = n(r a + (n-1)d) \Rightarrow S_n = \frac{n}{2} (r a + (n-1)d)$$

$$\begin{aligned} a_1 q^{n-1} + a_1 q^{n-2} + \dots + a_1 q + a_1 &= S_n \\ a_1 q^n + \underbrace{a_1 q^{n-1} + \dots + a_1 q + a_1}_{S_n - a_1} &= q S_n \\ a_1 q^n + S_n - a_1 &= q S_n \Rightarrow S_n(q-1) = a_1(q^n-1) \Rightarrow S_n = a_1 \times \frac{q^n-1}{q-1} \end{aligned}$$