ÇARPIM SEMBOLÜ

A. Tanım

$r, n \in Z$ ve $r \le n$ olmak üzere $f : Z \to R$, $f(k) = a_k$ fonksiyonu tanımlanmış olsun. Bu düşünce ile oluşturulan $a_r, a_{r+1}, a_{r+2}, ..., a_n$ terimlerinin çarpımını,

$$a_r + a_{r+1} + a_{r+2} + ... + a_n = \prod_{k=r}^{n} a_k$$ biçiminde

gösteririz.

Bu gösterimde kullandığımız $\prod$ sembolüne çarpım sembolü denir.

Örnek:

$$a_1.a_2.a_3.....a_n.a_{n+1}....a_{n+20} = \prod_{k=1}^{n+20} a_k$$

Örnek:

$$1.2.3....n....12 = \prod_{a=1}^{12} a$$

Örnek:

$$5.7.9.11...23 = \prod_{k=3}^{12} (2k - 1)$$

Örnek:

$$\frac{2}{3}.\frac{4}{5}.\frac{6}{7}.\frac{8}{9}...\frac{60}{61} = \prod_{k=1}^{30} \frac{2k}{2k+1}$$

Örnek:

$$\prod_{a=7}^{25} 2^{a+1} = 2^{7+1}.2^{8+1}.2^{9+1}....2^{25+1}$$

$$= 2^8.2^9.2^{10}...2^{25}.2^{26}$$

Örnek:

$$\prod_{m=12}^{25} \log(3m) = \log 36 . \log 39 . \log 42 ... \log 75$$

Örnek:

$14.17.20.23.26$

$= (3.4 + 2).(3.5 + 2).(3.6 + 2).(3.7 + 2).(3.8 + 2)$

$$= \prod_{a=4}^{8} (3a + 2)$$

Örnek:

$f(x) = 3x - 2$ olduğuna göre $\prod_{k=-3}^{-1} f(2k)$ ifadesinin eşitini bulalım.

Çözüm:

$f(x) = 3x - 2$ olduğuna göre,

$f(-6) = 3.(-6) - 2 = -20$

$f(-4) = 3.(-4) - 2 = -14$

$f(-2) = 3.(-2) - 2 = -8$ olur.

Buna göre,

$$\prod_{k=-3}^{-1} f(2k) = f(-6).f(-4).f(-2)$$

$$= (-20).(-14).(-8) = -2240$$

Kural

1. $\prod_{k=1}^{n} k = n!$

2. $\prod_{k=a}^{n} k = \frac{n!}{(a-1)!}$

Örnek:

$$\prod_{k=1}^{50} k = 1.2.3.4....50 = 50!$$

Örnek:

$$\prod_{k=21}^{57} k = 21.22.23.....57 = \frac{57!}{(21-1)!} = \frac{57!}{20!}$$

Kural

$$\prod_{k=1}^{n} a^k = a^{1+2+3+...+k} = a^{\frac{k.(k+1)}{2}}$$

Örnek:

$$\prod_{k=1}^{12} 8^k = 8^1.8^2.8^3.....8^{12} = 8^{\frac{12.13}{2}} = 8^{78} = 2^{234}$$

Örnek:

$\prod_{k=6}^{30} \left(1 - \frac{1}{k-2}\right)$ ifadesinin değerini bulalım.

Çözüm:

$$\prod_{k=6}^{30} \left(1 - \frac{1}{k-2}\right) = \prod_{k=6}^{30} \frac{k-3}{k-2} = \frac{3}{4}.\frac{4}{5}.\frac{5}{6}.....\frac{27}{28} = \frac{3}{28}$$

Örnek:

$\prod_{k=7}^{48} \log_k (k+1)$ ifadesinin değerini bulalım.

Çözüm:

$$\prod_{k=7}^{48} \log_k (k+1) = \log_7 8.\log_8 9.\log_9 10.....\log_{48} 49$$

$$= \log_7 49 = \log_7 7^2 = 2$$

B. Çarpımı Sembolünün Özellikleri

Özellik

1. $\prod_{k=1}^{n} a = a.a.a.....a = a^n$

2. $\prod_{k=p}^{n} a = a^{n-p+1}$

Örnek:

$$\prod_{k=1}^{100} 25 = 25.25.25.....25 = 25^{100} = 5^{200}$$

Örnek:

$$\prod_{k=-5}^{32} 3 = 3^{32-(-5)+1} = 3^{38}$$

Özellik

$$\prod_{k=1}^{n} (b.a_k) = b^n . \prod_{k=1}^{n} a_k$$

Örnek:

$\prod_{k=1}^{4} (2k^2)$ çarpımının değerini bulalım.

Çözüm:

$$\prod_{k=1}^{4} (2k^2) = 2^4 . \prod_{k=1}^{4} k^2 = 16.(1^2.2^2.3^3.4^2) = 9216$$

Özellik

$$\prod_{k=1}^{n} a_k = \prod_{k=1}^{p} a_k . \prod_{k=p+1}^{n} a_k$$

Örnek:

$$\prod_{k=1}^{30} k = \prod_{k=1}^{12} k . \prod_{k=13}^{30} k$$

Örnek:

$\prod_{k=7}^{25} (k+1)$ çarpımının değerini hesaplayalım.

Çözüm:

$$\prod_{k=1}^{6} (k+1) . \prod_{k=7}^{25} (k+1) = \prod_{k=1}^{25} (k+1)$$

$$\prod_{k=7}^{25} (k+1) = \frac{\prod_{k=1}^{25} (k+1)}{\prod_{k=1}^{6} (k+1).} = \frac{2.3.4.5\ldots26}{2.3.4.5.6.7} = \frac{26!}{7!}$$

Özellik

1. $\prod_{k=1}^{n} (a_k.b_k) = \prod_{k=1}^{n} a_k . \prod_{k=1}^{n} b_k$

2. $\prod_{k=1}^{n} \left(\frac{a_k}{b_k}\right) = \frac{\prod_{k=1}^{n} a_k}{\prod_{k=1}^{n} b_k}$

Örnek:

$\prod_{k=1}^{32} (k^3.3^k)$ çarpımının değerini hesaplayalım.

Çözüm:

$$\prod_{k=1}^{32} (k^3.3^k) = \prod_{k=1}^{32} k^3 . \prod_{k=1}^{32} 3^k$$

$$= (1^3.2^3.3^3....32^3).(3^1.3^2.3^3....3^{32})$$

$$= (1.2.3....32)^3.(3^{1+2+3+...+32})$$

$$= (32!)^3.3^{528}$$

Örnek:

$\prod_{k=1}^{3} \left(\frac{k^2}{k+1}\right)$ çarpımının değerini hesaplayalım.

Çözüm:

$$\prod_{k=1}^{3} \left(\frac{k^2}{k+1}\right) = \frac{\prod_{k=1}^{3} k^2}{\prod_{k=1}^{3} (k+1)} = \frac{1^2.2^2.3^2}{2.3.4} = \frac{3}{2} \text{ bulunur.}$$

Özellik

1. $\prod_{k=p}^{n} a_k = \prod_{k=p-r}^{n-r} a_{k+r}$

2. $\prod_{k=p}^{n} a_k = \prod_{k=p+r}^{n+r} a_{k-r}$

Örnek:

$\prod_{k=6}^{17} (\sqrt{2})^{k-5}$ işleminin sonucunu bulalım.

Çözüm:

$$\prod_{k=6}^{17} (\sqrt{2})^{k-5} = \prod_{k=6-5}^{17-5} (\sqrt{2})^{k+5-5}$$

$$= \prod_{k=1}^{12} (\sqrt{2})^k = (\sqrt{2})^1.(\sqrt{2})^2.(\sqrt{2})^3.....(\sqrt{2})^{12}$$

$$= (\sqrt{2})^{1+2+3+...+12} = (\sqrt{2})^{\frac{12.13}{2}}$$

$$= (\sqrt{2})^{78} = 2^{39}$$

Örnek:

$\prod\limits_{k=-3}^{29} \log_{k+7}(k+4)$ işleminin sonucunu bulalım.

Çözüm:

$$\prod_{k=-3}^{29} \log_{k+7}(k+4)$$

$$=\log_4 1.\log_5 2.\log_6 3.....\log_{36} 33$$

$$=0.\log_5 2.\log_6 3.....\log_{36} 33=0$$

Özellik

$$\prod_{k=1}^{n}\left(\prod_{i=1}^{m} a_{ki}\right)=\prod_{i=1}^{m}\left(\prod_{k=1}^{n} a_{ik}\right)$$

Örnek:

$\prod\limits_{m=2}^{3}\prod\limits_{n=3}^{4}(m+n)$ işleminin sonucu kaçtır?

Çözüm:

$$\prod_{m=2}^{3}\prod_{n=3}^{4}(m+n)=\prod_{m=2}^{3}(m+3).(m+4)$$

$$=\left[(2+3).(2+4)\right].\left[(3+3).(3+4)\right]$$

$$=5.6.6.7=1260$$

Örnek:

$\sum\limits_{n=1}^{2}\prod\limits_{m=1}^{3}(m.n)$ işleminin sonucu kaçtır?

Çözüm:

$$\sum_{n=1}^{2}\prod_{m=1}^{3}(m.n)=\sum_{n=1}^{2}\left[(1.n).(2.n).(3.n)\right]=\sum_{n=1}^{2}6.n^3$$

$$=6.1^3+6.2^3=6+48=54$$

Örnek:

$\prod\limits_{a=1}^{2}\sum\limits_{b=1}^{2}(a+b)-\sum\limits_{b=1}^{2}\prod\limits_{a=1}^{2}(a+b)$ işleminin sonucu kaçtır?

Çözüm:

$$\prod_{a=1}^{2}\sum_{b=1}^{2}(a+b)=\prod_{a=1}^{2}\left[(a+1)+(a+2)\right]$$

$$=\prod_{a=1}^{2}(2a+3)=(2.1+3).(2.2+3)$$

$$=5.7=35$$

$$\sum_{b=1}^{2}\prod_{a=1}^{2}(a+b)=\sum_{b=1}^{2}\left[(1+b).(2+b)\right]$$

$$=\left[(1+1).(2+1)\right]+\left[(1+2).(2+2)\right]$$

$$=2.3+3.4=6+12=18$$

$$\prod_{a=1}^{2}\sum_{b=1}^{2}(a+b)-\sum_{b=1}^{2}\prod_{a=1}^{2}(a+b)=35-18=17$$

Örnek:

$\prod\limits_{m=6}^{9}\prod\limits_{n=4}^{6}2^{2m-3n}$ işleminin sonucu kaçtır?

Çözüm:

$$\prod_{m=6}^{9}\prod_{n=4}^{6}2^{2m-3n}$$

$$=\prod_{m=6}^{9}\left(2^{2m-12}.2^{2m-15}.2^{2m-18}\right)$$

$$=\prod_{m=6}^{9}\left(2^{6m-45}\right)$$

$$=2^{36-45}.2^{42-45}.2^{48-45}.2^{54-45}=2^0=1$$

Çözümlü Sorular

1. $\prod\limits_{k=1}^{50} \dfrac{3k+2}{3k-1}$ çarpımının değeri kaçtır?

Çözüm:

$$\prod_{k=1}^{50} \frac{3k+2}{3k-1} = \frac{5}{2}.\frac{8}{5}.\frac{11}{8}.....\frac{149}{146}.\frac{152}{149} = \frac{152}{2} = 76$$

2. $\left(\dfrac{27}{8}\right)^{36-n} = \prod\limits_{n=0}^{8} \left(\dfrac{2}{3}\right)^{n+1}$ olduğuna göre n kaçtır?

Çözüm:

$\left(\dfrac{27}{8}\right)^{36-n} = \prod\limits_{n=0}^{8} \left(\dfrac{2}{3}\right)^{n+1}$ olduğuna göre,

$$\left(\frac{3}{2}\right)^{108-3n} = \left(\frac{2}{3}\right)^{1}.\left(\frac{2}{3}\right)^{2}.\left(\frac{2}{3}\right)^{3}...\left(\frac{2}{3}\right)^{9}$$

$$\left(\frac{2}{3}\right)^{3n-108} = \left(\frac{2}{3}\right)^{1+2+3+...+9}$$

$$\left(\frac{2}{3}\right)^{3n-108} = \left(\frac{2}{3}\right)^{45} \Rightarrow 3n-108 = 45$$

$\Rightarrow 3n = 153 \Rightarrow n = 51$ bulunur.

3. $\prod\limits_{k=-3}^{12} (k^2-3k-40)$ ifadesinin sonucunu bulunuz.

Çözüm:

$$\prod_{k=-3}^{12} (k^2-3k-40) = \prod_{k=-3}^{12} \left[(k-8).(k+5)\right]$$

$$= \prod_{k=1}^{16} (k-12).\prod_{k=1}^{16} (k+1)$$

$$= \left[(-11).(-10).....0....4\right].\left[2.3.4...17\right]$$

$$= 0.2.3.4...17 = 0$$

4. $\dfrac{\prod\limits_{k=-5}^{6} 2^{(k^3)}}{\sum\limits_{k=-10}^{-3} 8}$ ifadesinin eşitini bulunuz.

Çözüm:

$$\prod_{k=-5}^{6} 2^{(k^3)} = 2^{(-5^3)+(-4^3)+...+4^3+5^3+6^3}$$

$$= 2^{6^3} = 2^{216}$$

$$\sum_{k=-10}^{-3} 8 = (-3+10+1).8 = 64 = 2^6$$

$$\frac{\prod\limits_{k=-5}^{6} 2^{(k^3)}}{\sum\limits_{k=-10}^{-3} 8} = \frac{2^{216}}{2^6} = 2^{210}$$

5. $\prod\limits_{k=5}^{32} \prod\limits_{a=-23}^{-8} \dfrac{a-1}{a}$ işleminin sonucu kaçtır?

Çözüm:

$$\prod_{k=5}^{32} \prod_{a=-23}^{-8} \frac{a-1}{a} = \prod_{k=5}^{32} \frac{-24}{-23}.\frac{-23}{-22}......\frac{-8}{-7}.\frac{-9}{-8}$$

$$= \prod_{k=5}^{32} \frac{-24}{-8} = \prod_{k=5}^{32} 3 = 3^{32-5+1} = 3^{28}$$

6. $\sum\limits_{a=1}^{n+2} \prod\limits_{b=0}^{n} (b+1) = 20!$ olduğuna göre, n kaçtır?

Çözüm:

$$\sum_{a=1}^{n+2} \prod_{b=0}^{n} (b+1) = \sum_{a=1}^{n+2} \left[1.2.3...(n+1)\right]$$

$$= \sum_{a=1}^{n+2} (n+1)! = (n+2)(n+1)! = (n+2)!$$

$$\sum_{a=1}^{n+2} \prod_{b=0}^{n} (b+1) = (n+2)! = 20! \Rightarrow n+2 = 20 \Rightarrow n = 18$$

7. $x^2 - 2x + a + 1 = 0$ denkleminin kökleri x_1 ve x_2 dir.

$\prod_{n=1}^{2} (x_n + 1) = 12$ olduğuna göre, a kaçtır?

Çözüm:

Kökler toplamı; $x_1 + x_2 = 2$,

Kökler çarpımı; $x_1 . x_2 = a + 1$

$$\prod_{n=1}^{2} (x_n + 1) = (x_1 + 1).(x_2 + 1)$$

$$= (x_1 . x_2) + (x_1 + x_2) + 1$$

$$= a + 1 + 2 + 1 = a + 4$$

$$\prod_{n=1}^{2} (x_n + 1) = 12 \Rightarrow a + 4 = 12 \Rightarrow a = 8 \text{ olur.}$$

8. $\prod_{k=3}^{n} (1 - \frac{1}{k^2})$ ifadesinin sonucunu bulunuz.

Çözüm:

$$\prod_{k=3}^{n} (1 - \frac{1}{k^2}) = \prod_{k=3}^{n} (\frac{k^2 - 1}{k^2}) = \prod_{k=3}^{n} \frac{k-1}{k} . \prod_{k=3}^{n} \frac{k+1}{k}$$

$$= \left[\frac{2}{3}.\frac{3}{4}.\frac{4}{5}...\frac{n-1}{n}\right].\left[\frac{4}{3}.\frac{5}{4}.\frac{6}{5}...\frac{n+1}{n}\right]$$

$$= \frac{2}{n}.\frac{n+1}{3} = \frac{2n+2}{3n}$$

9. $\prod_{k=2}^{25} \log_{k+1}(k^2 + 4k + 4)$ ifadesinin sonucunu bulunuz.

Çözüm:

$$\prod_{k=2}^{25} \log_{k+1}(k^2 + 4k + 4) = \prod_{k=2}^{25} \log_{k+1}(k+2)^2$$

$$= \prod_{k=2}^{25} 2.\log_{k+1}(k+2) = 2^{24}. \prod_{k=2}^{25} \log_{k+1}(k+2)$$

$$= 2^{24}.\left[\log_3 4.\log_4 5.....\log_{26} 27\right]$$

$$= 2^{24}.\log_3 27 = 2^{24}.\log_3 3^3 = 3.2^{24}$$

10. $\prod_{k=1}^{n} 2^{\frac{k}{3}} < 128$ eşitsizliğini sağlayan n doğal sayısının alabileceği en büyük değer kaçtır?

Çözüm:

$\prod_{k=1}^{n} 2^{\frac{k}{3}} < 128$ olduğuna göre,

$$\Rightarrow 2^{\frac{1}{3}}.2^{\frac{2}{3}}.2^{\frac{3}{3}}.2^{\frac{4}{3}}.....2^{\frac{n}{3}} < 128 = 2^7$$

$$\Rightarrow 2^{\frac{1+2+3+4+...+n}{3}} < 2^7$$

$$\Rightarrow 2^{\frac{n.(n+1)}{2.3}} < 2^7 \Rightarrow \frac{n.(n+1)}{6} < 7$$

$$\Rightarrow n^2 + n - 42 < 0 \Rightarrow (n+7).(n-6) < 0$$

$$\Rightarrow -7 < n < 6 \text{ olur.}$$

Bu koşula uygun en büyük doğal sayı 5 tir.

11. $a_n = \prod_{k=1}^{n} \frac{2}{k}$ olduğuna göre a_{10} kaçtır?

Çözüm:

$$a_{10} = \prod_{k=1}^{10} \frac{2}{k} = \frac{2}{1}.\frac{2}{2}.\frac{2}{3}.....\frac{2}{10} = \frac{2^{10}}{10!} \text{ bulunur.}$$

12. $\prod_{a=2}^{c} \sum_{b=1}^{a} \frac{1}{b.(b+1)} = \frac{1}{16}$ olduğuna göre c kaçtır?

Çözüm:

$$\prod_{a=2}^{c} \sum_{b=1}^{a} \frac{1}{b.(b+1)} = \prod_{a=2}^{c} \left(\frac{1}{1.2} + \frac{1}{2.3} + ... + \frac{1}{a.(a+1)}\right)$$

$$= \prod_{a=2}^{c} \frac{a}{a+1} = \frac{2}{3}.\frac{3}{4}.\frac{4}{5}.\frac{5}{6}.....\frac{c}{c+1}$$

$$= \frac{2}{c+1}$$

$$\prod_{a=2}^{c} \sum_{b=1}^{a} \frac{1}{b.(b+1)} = \frac{2}{c+1} = \frac{1}{16} \Rightarrow c = 31 \text{ olur.}$$

13. $\sum_{n=-21}^{-3} \prod_{x=7}^{11} \cot(5x)$ işleminin sonucu kaçtır?

Çözüm:

$\cot 55 = \tan 35$ ise, $\cot 35.\cot 55 = \cot 55.\tan 35 = 1$ dir.

$\cot 50 = \tan 40$ ise, $\cot 40.\cot 50 = \cot 40.\tan 40 = 1$ dir.

$\cot 45 = 1$ dir.

$$\sum_{n=-21}^{-3} \prod_{x=7}^{11} \cot(5x)$$

$$= \sum_{n=-21}^{-3} (\cot 35.\cot 40.\cot 45.\cot 50.\cot 55)$$

$$= \sum_{n=-21}^{-3} (1.1.1) = \sum_{n=-21}^{-3} 1 = (-3+21+1).1 = 19$$

14. $\prod_{a=1}^{5} \prod_{a=1}^{4} \prod_{a=1}^{3} \prod_{a=1}^{2} 2$ ifadesinin sonucunu bulunuz.

Çözüm:

$$\prod_{a=1}^{5} \prod_{a=1}^{4} \prod_{a=1}^{3} \prod_{a=1}^{2} 2 = \prod_{a=1}^{5} \prod_{a=1}^{4} \prod_{a=1}^{3} (2.2)$$

$$= \prod_{a=1}^{5} \prod_{a=1}^{4} \prod_{a=1}^{3} 2^2$$

$$= \prod_{a=1}^{5} \prod_{a=1}^{4} (2^2.2^2.2^2)$$

$$= \prod_{a=1}^{5} \prod_{a=1}^{4} 2^6$$

$$= \prod_{a=1}^{5} (2^6.2^6.2^6.2^6)$$

$$= \prod_{a=1}^{5} 2^{24}$$

$$= 2^{24}.2^{24}.2^{24}.2^{24} = 2^{120}$$

15. $\prod_{k=3}^{42} \frac{k^2+5k+4}{k^2+7k+6}$ ifadesinin sonucunu bulunuz.

Çözüm:

$$\frac{k^2+5k+4}{k^2+7k+6} = \frac{(k+1).(k+4)}{(k+1).(k+6)} = \frac{k+4}{k+6} \text{ olduğundan,}$$

$$\prod_{k=3}^{42} \frac{k^2+5k+4}{k^2+7k+6} = \prod_{k=3}^{42} \frac{k+4}{k+6}$$

$$= \frac{7}{9}.\frac{8}{10}.\frac{9}{11}.\frac{10}{12}.....\frac{44}{46}.\frac{45}{47}.\frac{46}{48}$$

$$= \frac{7.8}{47.48} = \frac{7}{282}$$

16. $\prod_{k=3}^{n} (k^2-4) = a.\prod_{k=2}^{n} (k-1)$ olduğuna göre a nın n türünden değerini bulunuz.

Çözüm:

$$\prod_{k=3}^{n} (k^2-4) = \prod_{k=3}^{n} (k-2).\prod_{k=3}^{n} (k+2)$$

$$= \left[1.2.3.....(n-2)\right].\left[5.6.7.....(n+2)\right]$$

$$= (n-2)!.\frac{(n+2)!}{4!}$$

$$\prod_{k=2}^{n} (k-1) = 1.2.3.....(n-1) = (n-1)!$$

$\prod_{k=3}^{n} (k^2-4) = a.\prod_{k=2}^{n} (k-1)$ olduğuna göre,

$$\Rightarrow (n-2)!.\frac{(n+2)!}{4!} = a.(n-1)!$$

$$\Rightarrow a = \frac{(n-2)!.(n+2)!}{4!.(n-1)!} = \frac{(n-2)!.(n+2)!}{4!.(n-1).(n-2)!}$$

$\Rightarrow a = \frac{(n+2)!}{4!.(n-1)}$ bulunur.

17. $\prod_{a=2}^{c} \sum_{b=1}^{a} \frac{1}{b.(b+1)} = \frac{1}{16}$ ifadesinin sonucu kaçtır?

Çözüm:

$$\prod_{n=-8}^{12} \sum_{n=1}^{40} \left[(-1)^{n+2}.n\right]$$

$$= \prod_{n=-8}^{12} \left(-1+2-3+4-...-39+40\right)$$

$$= \prod_{n=-8}^{12} \left(1+1+1+...+1\right)$$

$$= \prod_{n=-8}^{12} 20 = (12+8+1).20 = 420$$

18. $\prod_{a=1}^{5} \prod_{b=4}^{6} 2^{a.b}$ ifadesinin sonucunu bulunuz.

Çözüm:

$$\prod_{a=1}^{5} \prod_{b=4}^{6} 2^{a.b} = \prod_{a=1}^{5} \left(2^{4.a}.2^{5.a}.2^{6.a}\right)$$

$$= \prod_{a=1}^{5} 2^{15.a}$$

$$= 2^{15.1}.2^{15.2}.2^{15.3}.2^{15.4}.2^{15.5}$$

$$= 2^{15+30+45+60+75} = 2^{225}$$

19. $f(x) = \sum_{k=1}^{x} \frac{1}{\sqrt{k+1}+\sqrt{k}}$ ve $g(x) = \prod_{k=1}^{f(x)} \sqrt{k}$ olduğuna göre $g(8)$ kaçtır?

Çözüm:

$$f(8) = \sum_{k=1}^{8} \frac{1}{\sqrt{k+1}+\sqrt{k}}$$

$$= \sum_{k=1}^{8} \frac{\sqrt{k+1}-\sqrt{k}}{\left(\sqrt{k+1}+\sqrt{k}\right)\left(\sqrt{k+1}-\sqrt{k}\right)}$$

$$= \sum_{k=1}^{8} \frac{\sqrt{k+1}-\sqrt{k}}{k+1-k} = \sum_{k=1}^{8} \sqrt{k+1}-\sqrt{k}$$

$$= \left(\sqrt{2}-\sqrt{1}\right)+\left(\sqrt{3}-\sqrt{2}\right)+\left(\sqrt{4}-\sqrt{3}\right)+...+\left(\sqrt{9}-\sqrt{8}\right)$$

$$= \sqrt{9}-\sqrt{1} = 3-1 = 2$$

$g(8) = \prod_{k=1}^{f(8)} \sqrt{k} = \prod_{k=1}^{2} \sqrt{k} = \sqrt{1}.\sqrt{2} = \sqrt{2}$ olur.

	Konu Bitmiştir.