## 20-Mavzu. Progressiyalar

**1.** O'suvchi arifmetik progressiyada $a_1 + a_2 + a_3 = 0$ va $a_1^2 + a_2^2 + a_3^2 = 98$ bo'lsa, shu arifmetik progressiyaning to'rtinchi hadini toping.
A) –49   B) 14   C) –14   D) 49

**2.** $a_1, a_2, \dots, a_8$ ketma-ketlikda ixtiyoriy uchta ketma-ket hadlari yig'indisi 30 ga teng. Agar ketma-ketlikning uchinchi hadi 7 ga teng bo'lsa, birinchi va sakkizinchi hadlarining yig'indisi nechaga teng?
A) 7   B) 14   C) 23   D) 27

**3.** To'rtinchi hadi 18 ga teng bo'lgan arifmetik progressiyaning dastlabki 7 ta hadi yig'indisini toping.
A) 80   B) 96   C) 126   D) 63

**4.** 25 dan boshlab ketma-ket nechta natural sonlarni qo'shganda yig'indi 196 ga teng bo'ladi?
A) 8   B) 7   C) 6   D) 5

**5.** Arifmetik progressiya uchun quyidagi formulalardan qaysilari o'rinli?
1) $a_n = \frac{a_{n-1} + a_{n+1}}{2}$    2) $S_n - S_{n-1} = a_n$    3) $2a_1 - a_1 + a_3 = a_4$    4) $S_n = \frac{a_1 + a_n}{2}$
A) 1;3   B) 2;4   C) 1;2   D) 2;3

**6.** Arifmetik progressiyada $a_{29} = 14a_{16}$ bo'lsa, Uning dastlabki 29 ta hadlari yig'indisini toping.
A) 29   B) 58   C) 3   D) 0

**7.** Arifmetik progressiyada $a_{23} = 11a_{13}$ bo'lsa, uning dastlabki yigirma uchta hadi yig'indisini toping.
A) 4   B) 46   C) 0   D) 23

**8.** Arifmetik progressiyada 8+15+22+…+141 yig'indini hisoblang.
A) 1390   B) 1415   C) 1490   D) 1341

**9.** Geometrik progressiyada 5+15+45+…+1215 yig'indini hisoblang.
A) 1720   B) 1820   C) 1840   D) 1920

**10.** $0,5 + 1 + 1,5 + 3 + 4,5 + 9 + \dots + 364,5 + 729$ yig'indini hisoblang.
A) 1639,5   B) 1789,5   C) 1047,5   D) 1740,5

**11.** Hisoblang: $1 - 5 + 25 - \ldots + 5^{100}$

A) $\frac{5(5^{100}-1)}{6}$      B) $\frac{5^{100}+1}{6}$      C) $\frac{5^{101}+1}{6}$      D) $\frac{5(5^{101}-1)}{6}$

**12.** $b_n = 3 \cdot 2^n$ geometrik progressiya dastlabki 6 ta hadi yig'indisi nechaga teng?
   A) 376   B) 377   C) 378   D) 380

**13.** $n$-hadi formulasi $a_n = 1 - (-1)^n$ bo'lgan ketma-ketlikning dastlabki 2016 ta hadlari yig'indisini toping
   A) 2016      B) 0      C) 4032      D) 1008

**14.** Arifmetik progressiyada $S_{20} - S_9 = 44$ bo'lsa, $a_{15}$ ni toping.
   A) 4   B) 6   C) 8   D) 11

**15.** Arifmetik progressiya dastlabki $n$ ta hadi yig'indisi $S_n = 5n^2$ bo'lsa, uning o'n beshinchi hadini toping.
   A) 130   B) 135   C) 140   D) 145

**16.** Sonli ketma-ketlikning dastlabki $n$ ta hadi yig'indisi $S_n = 2 \cdot 5^n - 1$ bo'lsa, uning oltinchi hadini toping.
   A) 64   B) 125000   C) 12500   D) 25000

**17.** Arifmetik progressiyada $S_n = m$ va $S_m = n$ bo'lsa, $S_{n+m}$ ni toping.
   A) $m+n$      B) $m-n$      C) $n-m$      D) $-m-n$

**18.** Arifmetik progressiya dastlabki 6 ta hadi yig'indisi 63, oxirgi 6 ta hadi yig'indisi esa 279 ga teng. Barcha hadlari yig'indisi 513 ga teng bo'lsa, uning nechta hadi bor?
   A) 16         B) 18         D) 20         D) 22

**19.** Arifmetik progressiya $n$ ta hadining yig'indisi $S_n = 4n^2 - 3n$ bo'lsa, shu arifmetik progressiyaning ayirmasini toping.
   A) 5         B) 6         D) 7         D) 8

**20.** Arifmetik progressiya dastlabki $n$ ta hadlari yig'indisi $S_n$ bo'lsa, $S_{n+3} - 3S_{n+2} + 3S_{n+1} - S_n$ ni hisoblang.
   A) $S_n$      B) $S_{n+1}$   C) $S_{n+2}$      D) 0

**21.** Geometrik progressiyada 1000 ta had bor. Juft o'rindagi hadlar yig'indisi $a$, toq o'rindagi hadlar yig'indisi $b$ bo'lsa, progressiya maxrajini toping.
   A) $\frac{a}{b}$   B) $\frac{b}{a}$   C) $a \cdot b$   D) $a \pm b$

**22.** Ayirmasi 0 ga teng bo'lmagan arifmetik progressiyaning 5-hadidan 23-hadigacha hadlar yig'indisi 209 ga teng. Shu arifmetik progressiyaning nechanchi hadi 11 ga teng bo'ladi?
A) 13   B) 16   C) 15   D) 14

**23.** Geometrik progressiyaning 20 ta hadi bor. Ushbu progresiyaning dastlabki 10 ta hadlari yig'indisi $m$ ga, oxirgi 10 ta hadlari yig'indisi $n$ ga teng bo'lsa, shu progressiyaning maxrajini toping.

A) $\dfrac{m}{n}$   B) $\sqrt[10]{\dfrac{m}{n}}$   C) $\pm\sqrt[10]{\dfrac{n}{m}}$   D) $\pm\sqrt[10]{\dfrac{m}{n}}$

**24.** O'suvchi geometrik progressiya birinchi va oxirgi hadi yig'indisi 66 ga, ikkinchi va oxiridan bitta oldingi had ko'paytmasi esa 128. Agar barcha hadlar yig'indisi 126 bo'lsa, uning nechta hadi bor?
A) 6   B) 7   C) 8   D) 9

**25.** Geometrik progressiyaning 9 ta hadi bor. Dastlabki 3 ta hadi yig'indisi $S_1$ ga keyingi 3 ta hadi yig'indisi esa $S_2$ ga teng. Oxirgi  uchta hadi yig'indisini toping.

A) $S_1^2 + S_2^2$   B) $S_1 \cdot S_2$   C) $\dfrac{S_2^2}{S_1}$   D) $\dfrac{S_1^2}{S_2}$

**26.** Geometrik progressiya barcha hadlari yig'indisi $S_1$ ga barcha hadlari teskarilari yig'indisi $S_2$ bo'lsa, uning birinchi hadi bilan oxirgi hadi ko'paytmasini toping.

A) $\dfrac{S_1}{S_2}$   B) $\dfrac{S_2}{S_1}$   C) $S_1 \cdot S_2$   D) $S_1 + S_2$

**27.** O'suvchi geometrik progressiyada dastlabki uchta hadlari yig'indisi 13 ga, dastlabki to'rtta hadlari yig'indisi 40 ga  teng bo'lsa, dastlabki yettita hadlari yig'indisini toping.
A) 1089   B) 1091   C) 1093   D) 1095

**28.** $(x^2 + 1) + (x^2 + 3)+\dots+(x^2 + 119) = 6000$ tenglamaning ildizlari ko'paytmasini toping.
A) $-40$    B) $-100$    C) 40    D) 100

**29.** $(a_n)$ arifmetik progressiya dastlabki $n$ ta toq nomerli hadlari yig'indisi uchun:
$a_1 + a_3+\dots+a_{2n-1} = 3n^2 + n$ tenglik o'rinli. Shu progressiyaning sakkizinchi hadini toping.
A) 24    B) 25   C) 26   D) 23

**30.** Hisoblang: $1 \cdot 4 + 2 \cdot 7 + 3 \cdot 10 + \ldots + 10 \cdot 31$
   A) 900    B) 1200    C) 1210    D) 1440

**31.** Cheksiz kamayuvchi geometrik progressiya hadlari yig'indisi 4 ga teng, hadlari kublarining yig'indisi esa 192 ga teng. Uning 1-hadini toping.
   A) 4    B) 5    C) 6    D) 7

**32.** Cheksiz kamayuvchi geometrik progressiya barcha hadlari kublari yig'indisining kvadratlari yig'indisiga nisbati 12:13. Agar dastlabki ikkita hadi yig'indisi $1\frac{1}{3}$ bo'lsa, progressiya maxrajini toping.
   A) $\frac{1}{3}$    B) $\frac{2}{3}$    C) $\frac{3}{4}$    D) $\frac{1}{6}$

**33.** Cheksiz kamayuvchi geometrik progressiya dastlabki 6 ta hadi yig'indisi uning barcha hadlari yig'indisining $\frac{7}{8}$ qismiga teng. Progressiya maxrajini toping.
   A) $\pm\frac{\sqrt{3}}{2}$    B) $\pm\frac{\sqrt{2}}{2}$    C) $\pm\frac{\sqrt{3}}{4}$    D) $\pm\frac{\sqrt{2}}{4}$

**34.** Cheksiz kamayuvchi geometrik progressiya juft o'rindagi hadlari yig'indisi 12 ga, toq o'rindagi hadlari yig'indisi 36 ga teng bo'lsa, 1-hadini toping.
   A) 30    B) 31    C) 32    D) 36

**35.** 1-hadi 1 ga teng bo'lgan cheksiz kamayuvchi geometrik progressiyaning har bir hadi o'zidan keyingi hadlari yig'indisining uchlanganiga teng. Uning 2-hadini toping.
   A) $\frac{1}{2}$    B) $\frac{1}{3}$    C) $\frac{1}{4}$    D) $\frac{1}{6}$

**36.** $\frac{5}{6} + \frac{5}{9} + \frac{10}{27} + \cdots$ ni hisoblang.
   A) 2,5    B) 3,5    C) 2,2    D) 2,4

**37.** $a_1, a_2, \ldots, a_n$ –arifmetik progressiya tashkil qilsa,
   $a_1^2 - a_2^2 + a_3^2 - a_4^2 + \cdots + a_{n-1}^2 - a_n^2$ ni toping.
   A) $-\frac{a_1+a_n}{2} \cdot d \cdot n$    B) $\frac{a_1+a_n}{2} \cdot d \cdot n$    C) $-\frac{a_1+a_n}{2} \cdot n$    D) $-\frac{a_1+a_n}{2} \cdot d$

**38.** 2; 5; 11; 20,… sonlar shunday hususiyatga egaki ikkita qo'shni hadlar ayirmasi 3,6,9,... arifmetik progressiyani tashkil etadi. Berilgan ketma ketlikning $n$-hadini toping.
   A) $\frac{3n^2-3n+7}{2}$    B) $\frac{3n^2+3n-4}{2}$    C) $\frac{3n^2-3n+4}{2}$    D) $\frac{3n^2-3n-4}{2}$

**39.** 5;7;11;17;… sonlar shunday xossaga egaki, ikkita qo'shni hadlar ayirmasi arifmetik progressiya tashkil qiladi. Shu ketma-ketlikning 100-hadini toping.

A) 9605    B) 9905    C) 9745   D) 10095

**40.** Cheksiz kamayuvchi geometrik progressiyaning dastlabki oltita hadi yig'indisi 315 ga, dastlabki uchta hadi yig'indisi esa 280 ga teng. Uning barcha hadlari yig'indisi toping.

A) 320   B) 340   C) 940   D) 980

**41.** $\sqrt[3]{x\sqrt[3]{y\sqrt[3]{x\sqrt[3]{y}\ldots}}} = \sqrt[3]{y\sqrt[3]{x\sqrt[3]{y\sqrt[3]{x}\ldots}}}$ va $x > 0, y > 0$ bo'lsa, $\frac{x^2+y^2}{2xy}$ ni toping.

A) 0   B) 1   C) $\frac{1}{2}$   D) $\frac{1}{4}$

## Kalitlar

| 1. | B | 16. | D | 31. | C |
|---|---|---|---|---|---|
| 2. | C | 17. | D | 32. | A |
| 3. | C | 18. | B | 33. | B |
| 4. | B | 19. | D | 34. | C |
| 5. | C | 20. | D | 35. | C |
| 6. | D | 21. | A | 36. | A |
| 7. | C | 22. | D | 37. | A |
| 8. | C | 23. | C | 38. | C |
| 9. | B | 24. | A | 39. | B |
| 10. | A | 25. | C | 40. | B |
| 11. | C | 26. | B | 41. | B |
| 12. | C | 27. | C | | |
| 13. | A | 28. | A | | |
| 14. | A | 29. | B | | |
| 15. | D | 30. | C | | |