

Pre-Calculus

Test 8

Mr. Klar

In problems 1-2, write the first five terms of the sequence.

1. $a_n = \left(-\frac{4}{5}\right)^{n-1}$ (Begin with $n = 1$.)
2. $a_1 = -7$ and $a_n = a_{n+1} + 5$.
3. Simplify $\frac{13! \cdot 3!}{3! \cdot 8!}$.
4. Simplify $\frac{n!}{(n+1)!}$.

In problems 5-6, find a formula for the n th term of the sequence.

5. Arithmetic: $a_1 = 42$, $d = -1600$
6. Geometric: $a_1 = 4544$, $a_{k+1} = \frac{1}{4}a_k$
7. Use sigma notation to write $\frac{2}{3(1)+1} + \frac{2}{3(2)+1} + \cdots + \frac{2}{3(12)+1}$.
8. Use sigma notation to write $2 + \frac{1}{2} + \frac{1}{8} + \frac{1}{32} + \frac{1}{128} \cdots$.

9 In problems 9-11, find the sum.

9. $\sum_{n=1}^7 (8n - 5)$
10. $\sum_{n=1}^8 24 \left(\frac{1}{6}\right)^{n-1}$
11. $5 - 2 + \frac{4}{5} - \frac{8}{25} + \frac{16}{125} - \cdots$
12. Write Pascal's Triangle somewhere on this page. Do at least 5 levels.
13. Expand and simplify $(2a - 5b)^4$.

In problems 14-17, Evaluate the expression.

14. ${}_9C_3$
15. ${}_{14}C_2$
16. ${}_{70}P_3$
17. ${}_7P_4$
18. Five students are randomly selected from a class of 23 to answer questions from a reading assignment. In how many ways can the five be selected?
19. Two integers from 1 to 120 are chosen by a random number generator. What is the probability that (a) both numbers are odd, (b) both numbers are less than 12, and (c) the same number is chosen twice?
20. Use Proof by Induction to prove the formula

$$3 + 6 + 9 + \cdots + 3n = \frac{3n(n+1)}{2}.$$