Factorial Practice

Simplify and evaluate. No calculators!

1. \(6!\)
2. \(\frac{5!}{3!}\)
3. \(\frac{6!}{4!}\)

4. \(\frac{6!}{4!12!}\)
5. \(\frac{5!}{2!12!}\)
6. \(\frac{7!}{3!12!}\)

7. \(\frac{6!}{(5-3)!3!}\)
8. \(\frac{7!}{(7-4)!4!}\)
9. \(\frac{4!}{(4-1)10!}\)

Simplify. (There should be no more factorials left)

10. \(\frac{n!}{(n-2)!}\)
11. \(\frac{n!}{(n+1)!}\)
12. \(\frac{n!}{(n-3)!}\)

13. \(\frac{(2n)!}{(2n+1)!}\)
14. \(\frac{(2n+1)!}{(2n+3)!}\)
15. \(\frac{[2(n+1)]!}{(2n)!}\)

Evaluate the limit.

16. \(\lim_{n \to \infty} \frac{n!}{(n+1)!}\)
17. \(\frac{(2n+1)!}{(2n-1)!}\)
18. \(\frac{x^n}{n!}\)

Find the derivative. No calculators. You may use factorials in your answer.

19. \(f^{10}\) of \(x^{10}\)
20. \(f^{15}\) of \(3x^{15}\)
21. \(f^{40}\) of \(5x^{40}\)