Sum to n terms:

13. $a^2 + (a+1)^2 + (a+2)^2 + \dots.$

14. $2 + 5 + 9 + 14 + \dots. + \frac{n(n+3)}{2}.$

15. $3 + 8 + 15 + 24 + \dots. + n(n+2).$

16. $1 + k + 2(2+k) + 3(3+k) + \dots. + n(n+k).$

16*a*. Show that the series:

$$1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4} + \frac{1}{5} - \dots.$$

may be transformed into either of the three forms:

$$\frac{1}{1.2} + \frac{1}{3.4} + \frac{1}{5.6} + \dots.$$

or
$$1 - \frac{1}{2.3} - \frac{1}{4.5} - \frac{1}{6.7} - \dots.$$

or
$$\frac{1}{2} + \frac{1}{1.2.3} + \frac{1}{3.4.5} + \frac{1}{5.6.7} + \frac{1}{7.8.9} + \dots.$$

17. How do two of the preceding results enable us to sum

$$\frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4} + \dots. \textit{ ad infinitum?}$$

18. What number is equal to the continued product:

$$2^{\frac{1}{4}}.4^{\frac{1}{8}}.8^{\frac{1}{16}}.16^{\frac{1}{32}}.32^{\frac{1}{64}} \dots. \textit{ ad infinitum?}$$

19. To what limit approaches the indefinitely continued product:

$$a^{\frac{1}{n}}.a^{\frac{2}{n^2}}.a^{\frac{3}{n^3}}.a^{\frac{4}{n^4}} \dots. ?$$

Limits.

Find the limits of

1. $\frac{(x+a)^3}{(x-b)^3}$ as x increases indefinitely.

2. $\frac{x^2}{ax}$ " " " "

3. $\frac{ax}{x^2}$ " " " "