

- 19** (a) The initial density is 500. The population density each successive year is 0.8 of the previous year. Therefore, $a_1 = 500$ and $a_n = 0.8a_{n-1}$.
- (b) $a_1 = 500$, $a_2 = 0.8(500) = 400$, $a_3 = 0.8(400) = 320$, $a_4 = 0.8(320) = 256$,
 $a_5 = 0.8(256) = 204.8$, and $a_6 = 0.8(204.8) = 163.84$. The population density is decreasing each year by 20%.
- (c) The terms of the sequence 500, 400, 320, 256, ... are a geometric sequence with $a_1 = 500$ and $r = 0.8$. Therefore, the n th term is given by $a_n = 500(0.8)^{n-1}$.