55 (a) The salary of the first employee at the beginning of the nth year is given by

$$a_n = 30{,}000 + (n-1)(2000) = 2000n + 28{,}000.$$

This is an arithmetic sequence with $a_1 = 30{,}000$ and $d = 2000$.

(b) The salary of the second employee at the beginning of the nth year is given by

$$b_n = 30{,}000(1.05)^{n-1}$$

This is a geometric sequence with $a_1 = 30{,}000$ and $d = 1.05$.

(c) At the beginning of the 10th year each salary is

$$a_{10} = 2000(10) + 28{,}000 = \$\,48{,}000,$$
$$b_{10} = 30{,}000(1.05)^{10-1} \approx \$\,46{,}540.$$

At the beginning of the 20th year the salaries are

$$a_{20} = 2000(20) + 28{,}000 = \$\,68{,}000,$$
$$b_{20} = 30{,}000(1.05)^{20-1} \approx \$\,75{,}809.$$

(d) The graph of each sequence is shown in *Figure 55*. With time the geometric sequence overtakes the arithmetic sequence, since $r > 1$.

[0, 30, 10] by [0, 150,000, 50,000]

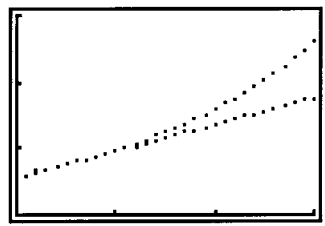

Figure 55