WRITING RULES Write a rule for the nth term of the geometric sequence that has the two given terms.

39. $a_1 = 3, a_3 = 12$

40. $a_1 = 1, a_5 = 625$

41. $a_1 = -\frac{1}{4}, a_4 = -16$

42. $a_3 = 10, a_6 = 270$

43. $a_2 = -40, a_4 = -10$

44. $a_2 = -24, a_5 = 1536$

45. $a_4 = 162, a_7 = 4374$

46. $a_3 = \frac{7}{4}, a_5 = \frac{7}{16}$

47. $a_4 = 6, a_7 = \frac{243}{8}$

FINDING SUMS Find the sum of the geometric series.

48. $\displaystyle\sum_{i=1}^{10} 5(2)^{i-1}$

49. $\displaystyle\sum_{i=1}^{8} 6(4)^{i-1}$

50. $\displaystyle\sum_{i=0}^{7} 12\left(-\frac{1}{2}\right)^i$

51. $\displaystyle\sum_{i=1}^{6} 4\left(\frac{1}{4}\right)^{i-1}$

52. $\displaystyle\sum_{i=1}^{12} 8\left(\frac{3}{2}\right)^{i-1}$

53. $\displaystyle\sum_{i=0}^{10} (-4)^i$

54. ★ **TAKS REASONING** What is the sum of the geometric series $\displaystyle\sum_{i=1}^{9} 2(3)^{i-1}$?

A 19,680   **B** 19,681   **C** 19,682   **D** 19,683

55. ★ **TAKS REASONING** Write a geometric series with 5 terms such that the sum of the series is 100. (*Hint:* Choose a value of r and then find a_1.)

56. **CHALLENGE** Using the rule for the sum of a finite geometric series, write each polynomial as a rational expression.
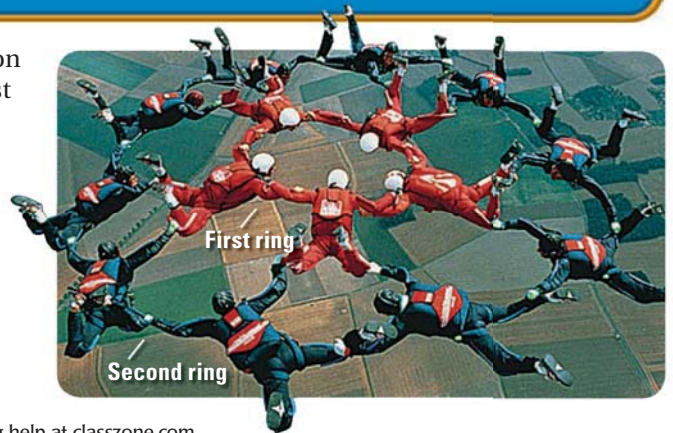
a. $1 + x + x^2 + x^3 + x^4$

b. $3x + 6x^3 + 12x^5 + 24x^7$

PROBLEM SOLVING

57. **SKYDIVING** In a skydiving formation with R rings, each ring after the first has twice as many skydivers as the preceding ring. The formation for $R = 2$ is shown.

a. Let a_n be the number of skydivers in the nth ring. Find a rule for a_n.

b. Find the total number of skydivers if there are $R = 4$ rings.

First ring
Second ring

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58. **SOCCER** A regional soccer tournament has 64 participating teams. In the first round of the tournament, 32 games are played. In each successive round, the number of games played decreases by one half.

a. Find a rule for the number of games played in the nth round. For what values of n does your rule make sense?

b. Find the total number of games played in the regional soccer tournament.

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