Practice Exercises

A. Find the indicated sum of the following geometric series.

1. $1+4+16+\ldots S_6$
2. $2+4+8+16+\ldots S_{10}$
3. $2+6+18+\ldots S_7$
4. $(-9)+6+(-4)+\ldots S_8$
5. $2+2\sqrt{2}+4+\ldots S_{10}$

B. Find each specified term.

1. $S_5 = \frac{31}{4};\ r = \frac{1}{2};\ a_1 = ?$
2. $S_8 = 2,550;\ r = 2;\ a_1 = ?$
3. $S_7 = 7,651;\ r = 3;\ a_1 = ?$
4. $S_{10} = 51,150;\ r = 2;\ a_1 = ?$

5. $S_6 = 126;\ \ r = -\frac{1}{2};\ \ a_6 = ?$

Problem Set

A. Find the indicated sum of the following geometric series.

1. $9+6+4+\ldots S_7$
2. $2+8+32+\ldots S_9$
3. $3+3\sqrt{3}+9+\ldots S_9$
4. $1+(-2)+4+(-8)\ldots S_8$
5. $(-2)+6+(-18)+\ldots S_6$

B. Find the sum of the first n terms of the related geometric series.

1. $a_1=\frac{1}{2}; r=4; n=6$
2. $a_1=13; r=4; n=7$

3. $a_1 = 318;\ \ r = \frac{1}{2};\ \ n = 7$

4. $a_1 = 168;\ \ r = \frac{3}{4};\ \ n = 8$

5. $a_1 = 4;\ \ r = -5;\ \ n = 8$

Problem Set

A.

1. $a_1 = 9,\ S_7 = ?,\ n = 7,$

$r = 6 \div 9 = \dfrac{2}{3}$

$S_n = \dfrac{a_1(1 - r^n)}{1 - r}$

$S_7 = \dfrac{9\left[1 - \left(\frac{2}{3}\right)^7\right]}{1 - \frac{2}{3}}$

$S_7 = \dfrac{9\left(1 - \frac{128}{2187}\right)}{\frac{1}{3}}$

$S_7 = 9\left(\dfrac{2059}{2187}\right)(3)$

$S_7 = \dfrac{2059}{81}$

2. $a_1 = 2,\ S_9 = ?,\ n = 9,$

$r = 8 \div 2 = 4$

$S_n = \dfrac{a_1(1 - r^n)}{1 - r}$

$S_9 = \dfrac{2(1 - 4^9)}{1 - 4}$

$S_9 = \dfrac{2(1 - 262,144)}{-3}$

$S_9 = \dfrac{2(-262,143)}{-3}$

$S_9 = \dfrac{-524,284}{-3}$

$$S_9 = 174,762$$

3. $a_1 = 3,\ S_9 = ?,\ n = 9,$
$r = 3\sqrt{3} \div 3 = \sqrt{3}$

$$S_n = \frac{a_1(1 - r^n)}{1 - r}$$

$$S_9 = \frac{3(1 - (\sqrt{3})^9)}{1 - \sqrt{3}}$$

$$S_9 = \frac{3(1 - 81\sqrt{3}}{1 - \sqrt{3}}$$

$$S_9 = \frac{3 - 243\sqrt{3}}{1 - \sqrt{3}}$$

$$S_9 = \frac{3 - 243\sqrt{3}}{1 - \sqrt{3}} \cdot \frac{1 + \sqrt{3}}{1 + \sqrt{3}}$$

$$S_9 = \frac{-726 - 240\sqrt{3}}{1 - 3}$$

$$S_9 = \frac{-726 - 240\sqrt{3}}{-2}$$

$$S_9 = 363 + 120\sqrt{3}$$

4. $a_1 = 1,\ S_8 = ?,\ n = 8,$
$r = -2 \div 1 = -2$

$$S_n = \frac{a_1(1 - r^n)}{1 - r}$$

$$S_8 = \frac{1(1 - (-2)^8)}{1 - (-2)}$$

$$S_8 = \frac{1 - 256}{3}$$

$$S_8 = \frac{-255}{3}$$
$$S_8 = -85$$

5. $a_1 = -2,\ S_6 = ?,\ n = 6,$
$r = 6 \div (-2) = -3$

$$S_n = \frac{a_1(1 - r^n)}{1 - r}$$
$$S_6 = \frac{(-2)(1 - (-3)^6)}{1 - (-3)}$$
$$S_6 = \frac{(-2)(1 - 729)}{4}$$
$$S_6 = \frac{(-2)(-728)}{4}$$
$$S_6 = 364$$

B.

1. $S_n = \frac{a_1(1 - r^n)}{1 - r}$

$$S_6 = \frac{\frac{1}{2}(1 - 4^6)}{1 - 4}$$
$$S_6 = \frac{\frac{1}{2}(1 - 4096)}{-3}$$
$$S_6 = \frac{\frac{1}{2}(-4095)}{-3}$$
$$S_6 = \frac{1365}{2}$$

2. $S_n = \frac{a_1(1 - r^n)}{1 - r}$

$$S_7 = \frac{13(1 - 4^7)}{1 - 4}$$

$$S_7 = \frac{13(1-16384)}{-3}$$
$$S_7 = \frac{13(-16383)}{-3}$$
$$S_7 = 70,993$$

$$S_7 = \frac{318\left(\frac{127}{128}\right)}{\frac{1}{2}}$$
$$S_7 = \frac{20193}{32}$$

3. $$S_n = \frac{a_1(1-r^n)}{1-r}$$
$$S_7 = \frac{318\left[1-\left(\frac{1}{2}\right)^7\right]}{1-\frac{1}{2}}$$
$$S_7 = \frac{318\left[1-\left(\frac{1}{128}\right)\right]}{\frac{1}{2}}$$
$$S_7 = \frac{318\left[1-\left(\frac{1}{128}\right)\right]}{\frac{1}{2}}$$

4. $$S_n = \frac{a_1(1-r^n)}{1-r}$$
$$S_8 = \frac{168\left[1-\left(\frac{3}{4}\right)^8\right]}{1-\frac{3}{4}}$$
$$S_8 = \frac{168\left[1-\left(\frac{6561}{65536}\right)\right]}{\frac{1}{4}}$$
$$S_8 = \frac{168\left(\frac{58975}{65536}\right)}{\frac{1}{4}}$$

$$S_8 = \frac{1238475}{2048}$$

5. $S_n = \dfrac{a_1(1-r^n)}{1-r}$

$$S_8 = \frac{4(1-(-5)^8)}{1-(-5)}$$

$$S_8 = \frac{4(1-390625)}{6}$$

$$S_8 = \frac{4(-390624)}{6}$$

$$S_8 = 260416$$