

$$10) \quad 5 + 10 + 20 + \dots + 20480$$

geo.

$$r = 2$$

$$\sum_{i=1}^{13} 5 \cdot 2^{i-1}$$

$$S_{13} = 5 \left(\frac{1-2^{13}}{1-2} \right)$$

$$40955$$

$$a_n = a_1 \cdot r^{n-1}$$

$$20480 = 5 \cdot 2^{n-1}$$

$$\log 40960 = \log 2^{n-1}$$

$$\frac{\log 40960}{\log 2} = (n-1) \log 2$$

$$\frac{\log 40960}{\log 2} = n-1$$

$$13 = n$$

P. 48D

$$7.) \sum_{k=1}^{17} k = 1 + 2 + 3 + \dots + 17$$

$$S_{17} = \frac{17}{2} (1 + 17) = 153$$

$$20.) \quad a_1 = 18$$

$$r = .8$$

$$S = \frac{a_1}{1-r}$$

$$= \frac{18}{1-.8} = \frac{18 \cdot 10}{.2 \cdot 10} = \frac{180}{2} = 90$$

$$17.) \quad a_1 = 153 \\ r = .69$$

$$S = \frac{a_1}{1-r}$$

16) Find the sum of the first 203 positive odd integers.

$$1 + 3 + 5 + \dots + \underline{\quad}$$

$a_1 = 1$ $y - y_1 = m(x - x_1)$
 $d = 2$ $y - 1 = 2(x - 1)$
 $n = 203$ $y = 2x - 2 + 1$
 $(1, 1)$ $y = 2x - 1$; $\textcircled{a_n = 2n - 1}$
 $(2, 3)$ $a_{203} = 2(203) - 1$
 405

$$11.) \quad 1 - \frac{\sqrt{2}}{2} + \frac{1}{2} - \dots$$

geometric

$$r = -\frac{\sqrt{2}}{2}$$

$$\sum_{n=1}^{\infty} 1 \cdot \left(-\frac{\sqrt{2}}{2}\right)^{n-1}$$

$$\begin{aligned} S &= \frac{a_1}{1-r} = \frac{1 \cdot 2}{2 + \frac{\sqrt{2}}{2} \cdot 2} \\ &= \frac{2}{2 + \sqrt{2}} \cdot \frac{(2 - \sqrt{2})}{(2 - \sqrt{2})} \\ &= \frac{4 - 2\sqrt{2}}{2} = 2 - \sqrt{2} \end{aligned}$$

$$14.) \quad a_6 = 6x + 1$$

$$a_9 = 12x^2 - 23$$

$$a_3 = \underline{\quad}$$

$$\begin{aligned} & 6x + 1 - 3(4x^2 - 2x - 8) \\ & - 12x^2 + 12x + 25 \end{aligned}$$

$$\begin{aligned} & (6, 6x + 1) \\ & (9, 12x^2 - 23) \end{aligned}$$

$$m = \frac{12x^2 - 23 - (6x + 1)}{9 - 6}$$

$$m = \frac{12x^2 - 6x - 24}{3}$$

$$m = 4x^2 - 2x - 8$$

$$17.) \sum_{n=2}^6 n^2$$

$$4 + 9 + 16 + 25 + 36$$

19.)

| |
|-----------------------------------|
| $a_1 = 3$ |
| $a_2 = 2$ |
| $a_n = a_{n-1} + (a_{n-2})^2 - 5$ |

$a_3 = a_{3-1} + (a_{3-2})^2 - 5$
 $= 2 + (3)^2 - 5 = 6$

$a_4 = a_3 + (a_2)^2 - 5$
 $= 6 + (2)^2 - 5 = 5$

5 terms

$$15.) \sum_{i=1}^{30} (-84 + 8i)$$

$$a_1 = -76$$

$$a_{30} = 156$$

arith.

$$S = \frac{n}{2} (a_1 + a_n)$$

$$= \frac{30}{2} (-76 + 156)$$

$$= 1200$$

$$25) \sum_{i=1}^{\infty} 7 \left(-\frac{3}{4}\right)^{i-1}$$

$$r = -\frac{3}{4}$$
$$|r| < 1$$

$$S = \frac{7}{1 - -\frac{3}{4}} = 4 \cdot \frac{7 \cdot 4}{1 + \frac{3}{4} \cdot 4} = \frac{28}{4+3}$$
$$= \frac{28}{7}$$
$$= 4$$

$$19.) \quad a_1 = 144 \quad a_3 = 16$$

$$a_n = a_1 \cdot r^{n-1}$$
$$a_n = 144 \cdot r^{n-1}$$
$$16 = 144(r^3)^{-1}$$
$$\frac{16}{144} = r^2$$
$$\pm \frac{1}{3} = \frac{4}{12} = r$$

13.) Geometric

$$a_3 = 12$$

$$a_6 = 96$$

$$a_{11} = \underline{\quad}$$

$$12 \cdot r^3 = 96$$

$$r^3 = 8$$

$$r = 2$$

$$12 = a_1 \cdot r^{3-1}$$

$$\frac{12}{r^2} = a_1$$

$$3 = a_1$$

$$a_n = 3 \cdot 2^{n-1}$$

$$a_{11} = 3 \cdot 2^{11-1}$$

$$96 = a_1 \cdot r^{6-1}$$

$$96 = \frac{12}{r^2} \cdot r^5$$

$$8 = r^3$$

$$2 = r$$

15) Find the sum of the first 12 positive 3 digit integers ending in 4.

$$104 + 114 + 124 + \dots +$$

Arith.
 $d = 10$

$$S_{12} = \frac{12}{2}(104 + 214)$$

$$a_n = 10n + 94$$

$$\begin{aligned}a_{12} &= 120 + 94 \\&= 214\end{aligned}$$

21.) geometric

$$a_n = a_1 r^{n-1}$$

$$a_1 = 36 \}$$

$$a_3 = 9 \}$$

$$36 \cdot \sqrt{\frac{8}{3}}$$

$$\frac{36\sqrt{8}}{\sqrt{3}} = 24\sqrt{6}$$

$$36 \cdot r^2 = 96$$

$$r^2 = \frac{96}{36} = \frac{8}{3}$$

$$r = \sqrt{\frac{8}{3}}$$

$$5.) \sum_{n=1}^6 (n^2 + 7)$$
$$8 + 11 + 16 +$$

$$10) \quad 5 + 10 + 20 + \dots + 20480$$

geo

$$r = 2$$

$$\sum_{n=1}^{13} 5 \cdot (2)^{n-1}$$

$$S_{13} = 5 \left(\frac{1 - 2^{13}}{1 - 2} \right)$$

40955

$$a_n = a_1 \cdot r^{n-1}$$

$$20480 = 5 (2)^{n-1}$$

$$\log(4096) = \log(2^{n-1})$$

$$\frac{\log 4096}{\log 2} = (n-1) \log 2$$

$$12 = n-1$$

$$13 = n$$

$$11.) \quad 1 - \frac{\sqrt{2}}{2} + \frac{1}{2} - \dots$$

geo
 $r = -\frac{\sqrt{2}}{2}$

$$\sum_{i=1}^{\infty} 1 \cdot \left(-\frac{\sqrt{2}}{2}\right)^{n-1}$$

$$\begin{aligned} S &= \frac{a_1}{1-r} = \frac{1 \cdot 2}{2 + \frac{\sqrt{2}}{2}} \\ &= \frac{2}{(2 + \sqrt{2})(2 - \sqrt{2})} \\ &= \frac{4 - 2\sqrt{2}}{2} = 2 - \sqrt{2} \end{aligned}$$

$$24.) \quad a_1 = 40,000 \quad \text{4%} \\ \text{geD.}$$

$$a_n = a_1 \cdot r^{n-1}$$
$$\boxed{a_n = 40,000(1.04)^{n-1}}$$

$$a_2 =$$

$$8,00(1.04) \\ \text{Total}$$

$$\begin{array}{r} 04 \times \\ 1.04 \\ \hline .96 \\ 2/5 \end{array}$$

15) Find the sum of the first 12 positive 3 digit integers ending in 4.

$$104 + 114 + 124 + \dots + \underline{\quad}$$

arith.
 $d = 10$

$(1, 104)$

$$y - 104 = 10(x - 1)$$

$$y = 10x - 10 + 104$$

$$a_n = 10n + 94$$

$$\begin{aligned} S_n &= \frac{n}{2}(a_1 + a_n) \\ &= \frac{12}{2}(104 + 214) \end{aligned}$$

$$\sum_{i=1}^{\infty} 5n(-1)^{n-1}$$

$$5, -10, 15, -20$$

$$a_1 = 5$$

$$a_2 = -10$$

$$a_3 =$$