$2n+1 \to$ odd #'s
$2n \to$ Even #'s

Notes	Find the first 5 terms of the sequence
! Factorial	62) $a_n = \frac{1}{(n+1)!}$
$0! = 1$	$a_n = \frac{1}{(n+1)!}$
$1! = 1$	$\frac{1}{2}, \frac{1}{6}, \frac{1}{24}, \frac{1}{120}, \frac{1}{720}$
$2! = 2\cdot1 = 2$	$n=1 \quad n=2 \quad n=3$
$3! = 3\cdot2\cdot1 = 6$	68. $a_n = \frac{(-1)^{2n+1}}{(2n+1)!}$
$4! = 4\cdot3\cdot2\cdot1 = 24$	$a_n = \frac{(-1)^{2n+1}}{(2n+1)!}$
$5! = 5\cdot4\cdot3\cdot2\cdot1 = 120$	$n=1 \quad n=2$
$6! = 720$	$\frac{-1}{6}, \frac{-1}{120}, \frac{-1}{5040}, \frac{-1}{362880}, \frac{-1}{11!}$
	$\frac{(-1)^3}{3!}, \frac{(-1)^5}{5!}$
	Simplify
	70) $\frac{(10! \cdot 3!)}{(4! \cdot 6!)}$
	Simplify
	$\frac{(10! \cdot 3!)}{(4! \cdot 6!)} = \frac{10\cdot9\cdot8\cdot7\cdot\cancel{6\cdot5\cdot4\cdot3\cdot2\cdot1}\cdot\cancel{3\cdot2\cdot1}}{4\cdot\cancel{3\cdot2\cdot1}\cdot\cancel{6\cdot5\cdot4\cdot3\cdot2\cdot1}}$
	$= \frac{10\cdot9\cdot\overset{2}{\cancel{8}}\cdot7}{\cancel{4}} = 1260$

$\dfrac{(2n)!}{(2n+2)!} = \dfrac{1}{(2n+2)(2n+1)}$	Simplify 72) $\dfrac{(n+2)!}{n!}$ 72) $\boxed{\dfrac{(n+2)!}{n!}} = \dfrac{(n+2)(n+1)\cancel{(n+0)}\cancel{(n-1)}\cancel{(n-2)}\cdots}{\cancel{n}\cancel{(n-1)}\cancel{(n-2)}\cdots}$ $= (n+2)(n+1)$ 74) $\dfrac{(2n+2)!}{(2n)!}$ $\dfrac{(2n+2)!}{(2n)!} = \dfrac{(2n+2)(2n+1)\cancel{(2n)}\cancel{(2n-1)}\cdots}{\cancel{(2n)}\cancel{(2n-1)}\cancel{(2n-2)}\cdots}$ $\dfrac{(3n+4)!}{(3n)!} = (3n+4)(3n+3)(3n+2)(3n+1)\cancel{(3n)}\cdots$

NOTES

Write the expression for the nth term.

$0, 3, 8, 15, 24$
$+3 \quad +5 \quad +7 \quad +9$

40) 3, 7, 11, 15, 19, ….

$a_n = a_1 + d(n-1)$

$\boxed{a_n = 3 + 4(n-1)}$

$= 3 + 4n - 4$

$\boxed{a_n = 4n-1}$

42) $\boxed{\frac{1}{1}, \frac{1}{4}, \frac{1}{9}, \frac{1}{16}, \frac{1}{25}}, \ldots$

$\boxed{a_n = \frac{1}{n^2}}$

$1, 4, 9, 16, 25$
$+3 \quad +5 \quad +7 \quad +9$

$2n+1 \rightarrow$ odds
$2n-1$

44) $\frac{2}{1}, \frac{3}{3}, \frac{4}{5}, \frac{5}{7}, \frac{6}{9}, \ldots$

$a_n = \frac{2+1(n-1)}{1+2(n-1)}$

$a_n = \frac{2+n-1}{1+2n-2} = \frac{n+1}{2n-1}$

46) $\frac{1}{3}, \frac{-2}{9}, \frac{4}{27}, \frac{-8}{81}, \ldots$

$a_n = a_1 (r)^{n-1}$ $\quad \boxed{a_n = \frac{1}{3}\left(-\frac{2}{3}\right)^{n-1}}$

$a_n = \frac{1(-2)^{n-1}}{3(3)^{n-1}}$

$+2 \quad +4 \quad +8 \quad +16$

48) $1+\frac{1}{2}, 1+\frac{3}{4}, 1+\frac{7}{8}, 1+\frac{15}{16}, 1+\frac{31}{32}, \cdots$

$+2 \quad +4 \quad +8 \quad +16$

$a_n = 1 + \frac{2^n - 1}{2(2)^{n-1}}$

$= 1 + \frac{2(2^{n-1}) - 1}{2(2^{n-1})}$

50) $1, 2, \frac{2^2}{2}, \frac{2^3}{6}, \frac{2^4}{24}, \frac{2^5}{120}, \cdots$

$n=1 \quad n=2 \quad n=3 \quad n=4 \quad n=5 \quad n=6$

$\frac{2^0}{0!}, \frac{2^1}{1!}, \frac{2^2}{2!}, \frac{2^3}{3!}, \frac{2^4}{4!}, \frac{2^5}{5!}$

$a_n = \frac{2^{n-1}}{(n-1)!}$

~~Find the Sum~~