

Section 10.1

2.) $a_n = \left(-\frac{1}{2}\right)^n : -\frac{1}{2}, \frac{1}{4}, -\frac{1}{8}, \frac{1}{16}, -\frac{1}{32}, \dots$

3.) $a_n = \frac{n}{n+1} : \frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \frac{5}{6}, \dots$

4.) $a_n = \frac{n-1}{n^2+2} : 0, \frac{1}{6}, \frac{2}{11}, \frac{1}{6}, \frac{4}{27}, \dots$

5.) $a_n = \frac{3^n}{n!} : 3, \frac{9}{2}, \frac{9}{2}, \frac{27}{8}, \frac{81}{40}, \dots$

7.) $a_n = \frac{(-1)^n}{n^2} : -1, \frac{1}{4}, -\frac{1}{9}, \frac{1}{16}, -\frac{1}{25}, \dots$

31.) $1, 4, 7, 10, \dots, 1+3(n-1) = \boxed{3n-2}$
 position: 1 2 3 4 ... n

34.) $1, \frac{1}{4}, \frac{1}{9}, \frac{1}{16}, \dots, \boxed{\frac{1}{n^2}}$
 position: 1 2 3 4 ... n

36.) $2, \frac{3}{3}, \frac{4}{5}, \frac{5}{7}, \frac{6}{9}, \dots, \boxed{\frac{n+1}{2n-1}}$
 position: 1 2 3 4 5 ... n

38.) $\frac{1}{3}, \frac{2}{3^2}, \frac{2^2}{3^3}, \frac{2^3}{3^4}, \dots, \boxed{\frac{2^{n-1}}{3^n}}$
 position: 1 2 3 4 ... n

40.) $1+\frac{1}{2}, 1+\frac{1}{2^2}, 1+\frac{1}{2^3}, 1+\frac{1}{2^4}, \dots, \boxed{1+\frac{1}{2^n}}$
 position: 1 2 3 4 ... n

41.) $-2, 2, -2, 2, -2, \dots, \boxed{(-1)^n 2}$
 position: 1 2 3 4 5 ... n

42.) $2, -4, 6, -8, 10, \dots$ $(-1)^{n+1} \cdot 2n$
 position: 1 2 3 4 5 ... n

44.) $1, \frac{x}{1}, \frac{x^2}{2 \cdot 1}, \frac{x^3}{3 \cdot 2 \cdot 1}, \frac{x^4}{4 \cdot 3 \cdot 2 \cdot 1}, \frac{x^5}{5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}, \dots$ $\frac{x^{n-1}}{(n-1)!}$
 position: 1 2 3 4 5 6 ... n

50.) $5, 5 \cdot 2, 5 \cdot 2^2, 5 \cdot 2^3, 5 \cdot 2^4, \dots$ $5 \cdot 2^{n-1}$
 position: 1 2 3 4 5 ... n

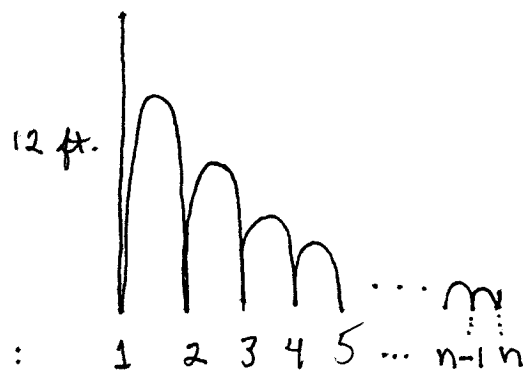
51.) $2, 2 \cdot 3, 2 \cdot 3^2, 2 \cdot 3^3, \dots$ $2 \cdot 3^{n-1}$
 position: 1 2 3 4 ... n

66.) $1 + 2 + 3 + 4 + \dots + n = \frac{1}{2}n(n+1)$

a.) $1, 3, 6, 10, 15, \dots$

b.) $1 + 2 + 3 + \dots + 50 = \frac{1}{2}(50)(50+1) = 1275$

68.) a.)



rebound: $\left(\frac{2}{3}\right)12, \left(\frac{2}{3}\right)^2 12, \left(\frac{2}{3}\right)^3 12, \left(\frac{2}{3}\right)^4 12, \dots$ $\left(\frac{2}{3}\right)^n 12$
 position: 1 2 3 4 ... n

Worksheet 9

①

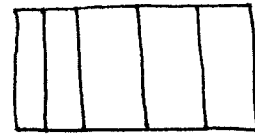
<u>position</u>	<u>number</u>
1	$5 = 5$
2	$6 = 5 + (1)$
3	$8 = 5 + (1 + 2)$
4	$11 = 5 + (1 + 2 + 3)$
5	$15 = 5 + (1 + 2 + 3 + 4)$
6	$20 = 5 + (1 + 2 + 3 + 4 + 5)$
$\vdots$	$\vdots$
n	$5 + (1 + 2 + 3 + \dots + (n-1))$ $= 5 + \frac{(n-1)((n-1)+1)}{2}$ $= \boxed{5 + \frac{(n-1)n}{2}}$

②

<u># weeks</u>	<u>weight</u>
1	$140 + (.01)140 = (1+.01)140 = (1.01)140$
2	$(1.01)140 + (.01)(1.01)140 = (1+.01)(1.01)140 = (1.01)^2 140$
3	$(1.01)^2 140 + (.01)(1.01)^2 140 = (1.01)^3 140$
4	$(1.01)^4 140$
$\vdots$	$\vdots$
n	$(1.01)^n 140$

If $n = 60$ weeks then weight is

$$(1.01)^{60} 140 = \boxed{254.3 \text{ lbs.}}$$



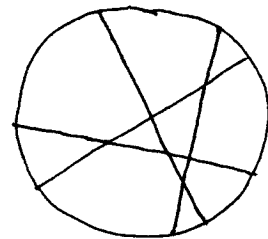
③

<u># lines</u>	<u># rectangles</u>
1	3 = 1+2
2	6 = 1+2+3
3	10 = 1+2+3+4
4	15 = 1+2+3+4+5
5	21 = 1+2+3+4+5+6
⋮	⋮
n	$1+2+3+4+\dots+(n+1) = \frac{(n+1)((n+1)+1)}{2}$ $= \frac{(n+1)(n+2)}{2}$

If $n=200$ lines then $\frac{(200+1)(200+2)}{2} = 20,301 \text{ rec's}$

④

<u># lines</u>	<u># pieces</u>
1	2 = 1+(1)
2	4 = 1+(1+2)
3	7 = 1+(1+2+3)
4	11 = 1+(1+2+3+4)
5	16 = 1+(1+2+3+4+5)
⋮	⋮
n	$1 + (1+2+3+4+\dots+n) = 1 + \frac{n(n+1)}{2}$



If $n=300$ lines then

$$1 + \frac{300(300+1)}{2} = 45,151 \text{ parts}$$