32 $P(n, r)$

$P(7, 3) = \underbrace{7 \cdot 6 \cdot 5}$

n r

$k < r$?

Q k

7 1 init

$1 < 3$ y $(7-1) \cdot 7 = 42$ $1+1 = 2$

$2 < 3$ y $(7-2) \cdot 42 = 210$ $2+1 = 3$

$3 < 3$ n

r

r-1 r-1 r-1

$4r - 3$

~~2~~ rows

r-1 full rows

4 in each full row

$4(r-1) + 1$

30. To try $n = 5$

Initialize

$k < \cancel{x}\,5$?	c	a	b	k
	2	1	1	1
$1 < 5$ y	$1+1=2$	1	2	$1+1=2$
$2 < 5$ y	$1+2=3$	2	3	$2+1=3$
$3 < 5$ y	$2+3=5$	3	5	$3+1=4$
$4 < 5$ y	8	5	8	$4+1=5$
$5 < 5$ n				
n	$n-1$			$n-1$

$n-1$ rows

3 per row

$= 3\cdot(n-1)+1$

$= 3n-2$

Thm 9.2 a pg. 487

$$S_n = a\,S_{n-1} + b\,S_{n-2}$$

$$x^2 = ax + b \cdot 1$$

solve for $x = r_1, r_2$

if $r_1 \neq r_2$

$$S_n = C_1 r_1^n + C_2 r_2^n$$

if $r_1 = r_2$ then

$$S_n = (c_1 + nc_2)\, r_1^n$$

Sec. 9.3

pg 492 #

13, 17, 23

Ex. 9.15 $\boxed{S_0 = 7,\ S_1 = 4}$

$$S_n = -S_{n-1} + 6S_{n-2}$$

$$x^2 = -1 \cdot x + 6$$

$$x^2 + x - 6 = 0$$

$$(x+3)(x-2) = 0$$

$x = -3$ $\quad x = 2$

$r_1 = -3$ $\quad r_2 = 2$

$$S_n = C(-3)^n + d(2)^n$$

$$S_0 = C \cdot 1 + d \cdot 1 = 7$$

$$S_1 = C(-3) + d(2) = 4$$

$$C = 7 - d$$

$$(7-d)(-3) + 2d = 4$$

$$-21 + 3d + 2d = 4$$

$$5d = 25$$

$$d = 5$$

$$C + 5 = 7$$

$$C = 2$$

$$S_n = 2(-3)^n + 5(2^n)$$