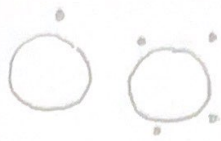


Quiz 5

1)



$$\binom{5}{1} Q_4^4 = 5 \cdot 3! = 30$$

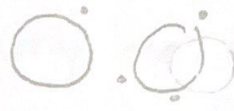
$$\binom{5}{2} Q_3^3 = 10 \cdot 2! = 20$$

$$\text{Total: } 30 + 20 = 50$$

2) (a)



$$S(4,1) = Q_4^4 = 3! = 6$$



$$S(4,2) = \binom{4}{1} Q_3^3 + \frac{1}{2} \binom{4}{2}$$

$$= 4 \cdot 2! + \frac{1}{2} \cdot 6 = 11$$



$$S(4,3) = \binom{4}{2} = 6$$



$$S(4,4) = 1$$

$$S(4,1) = 6 \quad S(4,2) = 11 \quad S(4,3) = 6 \quad S(4,4) = 1$$

$$(b) \quad x(x+1)(x+2)(x+3)$$

$$= x^4 + x^3 + x^2 + 2x^2 + 3x^2 + 2x + 3x + 6x + 6$$

$$= x^4 + 6x^3 + 11x^2 + 6x$$

↑
 $S(4,4)$

↑
 $S(4,3)$

↑
 $S(4,2)?$

↑
 $S(4,1)?$

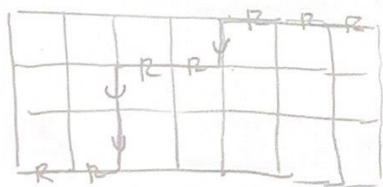
$$3) \quad s(7,2) = s(6,1) + 6 \cdot s(6,2) \\ = 120 + 6 \cdot 274 = 1764$$

$$4) \quad \binom{12-4+1}{4} = \binom{9}{4}$$

$$5) \quad \binom{n}{k} \cdot 2^k$$

\uparrow choose k pairs
 \nwarrow choose exactly one element from each pair

6)



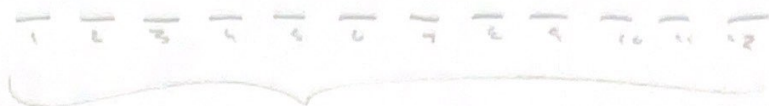
Will need 3 "up steps"
 out of the ten
 total steps

$$\binom{10}{3}$$

$$7)(a) \quad P(X) = \{ \emptyset, \{1\}, \{b\}, \{R\}, \{1, b\}, \{1, R\}, \{b, R\}, \{1, b, R\} \}$$

$$(b) \quad 2^n$$

8)



choose subset of size four from the positions to place the 1's

Need no consecutive 1's so

$$\binom{12-4+1}{4} = \binom{9}{4}$$

9) (a) $t_1 = 1$

$t_2 = 2$ or

$t_3 = 3$ or or

$t_4 = 5$ or or or or

$t_5 = 8$ or