

Homework 3 solutions

3.1

$$(2) \quad \overline{5} \quad \overline{4} \quad \overline{3} \quad \overline{2} \quad \overline{1}$$

$$5! = 120$$

(4)

$$\overline{4} \cdot \overline{5} \cdot \overline{3} \cdot \overline{2} = 120!$$

$$(c) \quad {}_4 P_4 = \frac{4!}{(4-4)!} = 4! = 24$$

$$(b) \quad {}_6 P_5 = \frac{6!}{1!} = 6! = 120 \cdot 6 = 720$$

$$(c) \quad {}_7 P_2 = \frac{7!}{(7-2)!} = \frac{7!}{5!} = 7 \cdot 6 = 42$$

$$(d) \quad {}_n P_{n-1} = \frac{n!}{(n-(n-1))!} = \frac{n!}{1!} = n!$$

$$(e) \quad {}_n P_{n-2} = \frac{n!}{(n-(n-2))!} = \frac{n!}{2!} = \frac{n!}{2}$$

$$(f) \quad {}_{n+1} P_{n-1} = \frac{(n+1)!}{(n+1-(n-1))!} = \frac{(n+1)!}{2!} = \frac{(n+1)!}{2}$$

(9) (c) $12!$

(b) ~~$\overline{6} \overline{5} \overline{5} \overline{4} \overline{4} \overline{3} \overline{2}$~~ $(6!)^2 \cdot 120!$

$$\overline{12} \quad \overline{6} \quad \overline{5} \quad \overline{5} \quad \overline{4} \quad \overline{4} \quad ; \quad \dots$$

$$6! \cdot 5! \cdot 12$$

$$(17) n \cdot {}_{n-1}P_{n-1} = n \cdot \frac{(n-1)!}{0!} = n!$$

$${}_n P_n = \frac{n!}{(n-n)!} = n! \quad \checkmark$$

3.2

$$(2) {}_n C_r = \frac{n!}{r!(n-r)!}$$

$${}_n C_{n-r} = \frac{n!}{(n-r)!(n-(n-r))!} = \frac{n!}{(n-r)! r!} \quad \checkmark$$

$$(4) {}_{52} C_6 = \frac{52!}{6!(52-6)!} = \frac{52!}{6! 46!} = \frac{52 \cdot 51 \cdot 50 \cdot 49 \cdot 48 \cdot 47}{6}$$

$$(2) {}_5 C_3 = \frac{5!}{3!(5-3)!} = \frac{5!}{3! 2!} = \frac{4 \cdot 5}{2!} = \frac{2 \cdot 5}{1} = 10$$