① A) $4 \cdot p(26,4) \cdot p(10,3)$

B) $\binom{9}{4}\binom{9}{4}$

② $(3x-2y)^9$ of x^4y^5

$$\binom{9}{4}(3x)^4(-2y)^5 = (126)(81)(-32)x^4y^5$$

$$= -326592x^4y^5$$

$12x$ with 3: $\frac{2(2)!}{(2)!(n-2)!} = \frac{24}{(2!)(4-2)!} = \frac{24}{2 \cdot 2} = 6$

$$\binom{2n}{2} = 2\binom{n}{2} + n^2 \qquad \binom{n}{k} = \frac{n!}{k!(n-k)!}$$

$$\frac{2n!}{2!(2n-2)!} = 2\left(\frac{n!}{2!(n-2)!}\right) + n^2 \qquad \frac{2(n!)}{2!\,n!(n-2)!} = \frac{n!}{(n-2)!} + n^2$$

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

$$\frac{(2n)(2n-1)}{2} \longleftrightarrow = n(n-1) + n^2 = 2n^2 - n = \frac{4n^2-2n}{2}$$

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

4

5 cards, 52, 13 cards per set

$\binom{13}{1}\binom{4}{3} \cdot \binom{12}{1}\binom{4}{2} = 3744$

5

Begin: $2 \cdot \binom{6}{6} = 1440$

(1 7 6 5 4 3 2) or (2 7 6 5 4 3 1)

6 A $\binom{22}{5}$

B $\binom{10}{2}\binom{12}{3}$

C $\binom{12}{3}\binom{10}{2}$