1.

| | choose_fac() | choose_dp() | choose() |
|---|---|---|---|
| n = 10, k = 5 | 252 | 252 | 252 |
| n = 15, k = 5 | 4 | 3003 | 3003 |
| n = 20, k =10 | 0 | 184756 | 184756 |
| n = 30, k =15 | 0 | 155117520 | 155117520 |
| n = 60, k = 30 | 0 | -1515254800 | 1.182646e+17 |

2.

When n = 10, k=5, each methods return the same value.

When 30>=n>=15, choose_fac() method returns 4 or 0 and the other two methods return the correct answer. The reason of that is choose_fac() uses the function fac(), which returns the int type(4 byte), so the significant decimal digits of fac() return is 11. When n>=15, the return digit is larger than 12, so it will return a wrong answer. choose_dp() doesn't use the fac() as an inner function and it uses the dynamic programming, so its return value's digit is smaller than 12 and could return correct answer

When n=60, k=30. The return value's digit is 17, which is higher than the int significant decimal digits. Choose() is a function in R, and it has larger significant decimal digits, so only choose() could return the correct answer.