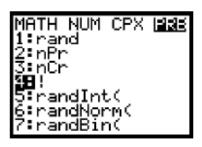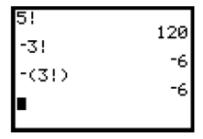## Note 10C • Factorials

To find the factorial command, press MATH PRB 4:!. For example, to find 5!, press 5 MATH PRB 4:! ENTER.

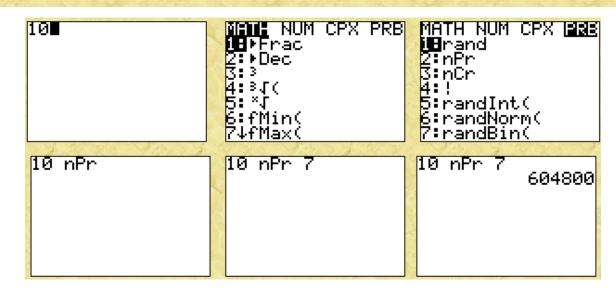In the order of operations, factorial has higher precedence than negation, so $-3!$ is equivalent to $-(3!)$.

```
MATH NUM CPX PRB
1:rand
2:nPr
3:nCr
4:!
5:randInt(
6:randNorm(
7:randBin(
```

```
5!
            120
-3!
             -6
-(3!)
             -6
■
```

Calculating a Permuation

In mathematics, to calculate the permutation of n things taken r at a time, we use the formula

$$_nP_r = \frac{n!}{(n-r)!}$$. The TI-83/84 has this formula already built in.

To calculate $_{10}P_7 = \frac{10!}{(10-7)!}$, on the home screen first press **10**, then press the **MATH** key. Next press the **RIGHT ARROW** key three times so that **PRB** is highlighted. Press **2** to select the permuation formula. Next type **7** and press **ENTER**. The results are shown below.

```
10■
```

```
MATH NUM CPX PRB
1:►Frac
2:►Dec
3:3
4:3√(
5:×√
6:fMin(
7↓fMax(
```

```
MATH NUM CPX PRB
1:rand
2:nPr
3:nCr
4:!
5:randInt(
6:randNorm(
7:randBin(
```

```
10 nPr
```

```
10 nPr 7
```

```
10 nPr 7
          604800
```

Calculating a Combination

In mathematics, to calculate the combination of n things taken r at a time, we use the formula

$$_nC_r = \frac{n!}{r!(n-r)!}$$. The TI-83/84 has this formula already built in.

To calculate $_{10}C_7 = \frac{10!}{7!(10-7)!}$, on the home screen first press **10,** then press the **MATH** key. Next press

the **RIGHT ARROW** key three times so that **PRB** is highlighted. Press **3** to select the combination formula. Next type **7** and press **ENTER.** The results are shown below.


```
10█
```

```
MATH  NUM  CPX  PRB
1█▶Frac
2:▶Dec
3:³
4:³√(
5:ˣ√
6:fMin(
7↓fMax(
```

```
MATH  NUM  CPX  PRB
1█rand
2:nPr
3:nCr
4:!
5:randInt(
6:randNorm(
7:randBin(
```

```
10 nCr █
```

```
10 nCr 7
```

```
10 nCr 7
                120
```