

**You Try:**

Evaluate the following using the factorial key on a calculator.

a)  $4!$

$$4 \times 3 \times 2 \times 1 \\ = 24$$

b)  $\frac{6!}{4!}$

$$\frac{6 \times 5 \times 4 \times 3 \times 2 \times 1}{4 \times 3 \times 2 \times 1} = 30$$

OR

$$\frac{6 \times 5 \times 4 \times 3 \times 2 \times 1}{4 \times 3 \times 2 \times 1} = 6 \times 5 = 30$$

c)  $\frac{(12!5!)}{(2!9!)}$

d)  $\frac{12!}{8! \times 2!}$

5940

e)  $\frac{300!}{299!}$

$$\frac{300 \times 299!}{299!}$$

= 300

**Example 2**There are 8 students waiting in line to get into the Zoo. In how many ways can these students be re-arranged?

$$8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1$$

OR

$$8! = 40320 \text{ ways}$$

**Example 3**

A grandmother has 9 pictures of her grandchild. She wants to place them in the frame shown below. How many different ways can she place the 9 photos?

$$9! \text{ ways}$$

$$362880 \text{ ways}$$

**Example 4**Three new teachers are starting at a new school. There are 3 classrooms available. How many ways can the classrooms be assigned to the new teachers?

$$3 \times 2 \times 1 = 6 \text{ ways}$$

classrooms

