

Permutation Exercise 2

Question 1:

Evaluate

- (i) $8!$
- (ii) $4! - 3!$

Question 2:

Is $3! + 4! = 7!$?

Question 3:

Compute

$$8! / (6! \times 2!)$$

Question 4:

Calculate x if

$$\frac{1}{6!} + \frac{1}{7!} = \frac{x}{8!}$$

Question 5:

Evaluate,

$$n! / (n-r)!$$

when

- (i) $n = 6, r = 2$
- (ii) $n = 9, r = 5$

Solution 1

We know that

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$$n! = n(n-1)(n-2)\dots 3 \times 2 \times 1$$

So solving the below questions based on that

(i) $8! = 1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8 = 40320$

(ii) First calculate the factorials

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

$$3! = 1 \times 2 \times 3 = 6$$

$$\text{Then } 4! - 3! = 24 - 6 = 18$$

Solution 2

We know that factorials is given by

$$n! = n(n-1)(n-2)\dots 3 \times 2 \times 1$$

So solving the below questions based on that

$$3! = 1 \times 2 \times 3 = 6$$

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

$$3! + 4! = 6 + 24 = 30$$

$$7! = 1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 = 5040$$

So it is clear that

$$3! + 4! \neq 7!$$

Solution 3

$$8! / (6! \times 2!)$$

$$= 8 \times 7 \times 6! / 6! \times 2$$

$$= 8 \times 7 / 2 = 28$$

Solution 4:

$$\frac{1}{6!} + \frac{1}{7!} = \frac{x}{8!}$$

$$\frac{1}{6!} + \frac{1}{7 * 6!} = \frac{x}{8 * 7 * 6!}$$

Cancelling 6! On both the sides

$$1 + \frac{1}{7} = \frac{x}{56}$$

Solving this

$$x=64$$

Solution 5:

$$n!/(n-r)!$$

when

(i) $n = 6, r = 2$

(ii) $n = 9, r = 5$

$$n!/(n-r)! = 6!/4! = 30$$

$$n!/(n-r)! = 9!/4! = 9 * 8 * 7 * 6 * 5 = 15120$$