

n!

$$4! = 4 \times 3 \times 2 \times 1 = \boxed{24}$$

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(n-1)!

$$(4-1)! = 3! = 3 \times 2 \times 1 = \boxed{6}$$

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$$\frac{(n-1)!}{2} = \frac{3!}{2} = \frac{6}{2} = \boxed{3}$$

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$$\binom{4}{4} = \frac{4!}{4! \times 0!} = 1 \quad 4! = 24$$

$$1 \times 24 = \boxed{24}$$

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$$(4-1)! = 3! = 6$$

$$1 \times 6 = \boxed{6}$$

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$$\frac{(n-1)!}{2} = \frac{(4-1)!}{2} = \frac{6}{2} = 3 \quad 1 \times 3 = \boxed{3}$$

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$$\binom{4}{3} = \binom{4}{1} = 4 \quad 4! = 24$$

$$4 \times 24 = \boxed{96}$$

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$$0! = \boxed{1}$$

arbitrary [2]

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$$0! \times 2 = 1 \times 2 = \boxed{2}$$

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$$4! = 24 \quad \frac{24}{2} = \boxed{12}$$

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$$r! \times r! = r! \times r = \boxed{r! r}$$

11

$$e < d < c$$
$$\binom{c}{r} = \frac{c!}{r! (c-r)!} = r.$$

$$r! \times r! = r! \times r = \boxed{r! r}$$

12

$$a < d < c$$

$$\binom{c}{r} = r.$$

$$a \rightarrow d \rightarrow c$$
$$r! \times r = \boxed{r! r}$$

13

$$e < c$$
$$a < d$$

$$r! \times \frac{1}{r} \times \frac{1}{r} = \frac{r!}{r^2} = \boxed{r! r}$$

14

$$r! \times r! = r! \times r = \boxed{r! r}$$

15

$$r! \times r! \times r! = r! \times r! \times r = \boxed{r! r! r}$$

16

$$r! = r!$$
$$\binom{c}{r} = r$$

$$r! \times r \times r! = r! \times r \times r! = \boxed{r! r! r}$$

17

$$10! = r! r! r! = r! r! r! r! r! r! r! r! r! r! = r! r! r! r! r! r! r! r! r! r!$$

18

$$r! \times r! \times r! = r! \times r! \times r! = \boxed{r! r! r!}$$

19

$$r! \times r! = r! \times r! = \boxed{r! r!}$$

20