Practice

Answer Key

1. a) How many arrangements are possible using all of the letters in WHISTLER?

$$8! = 40320$$

2. Evaluate the following expressions.

a) $5! = \underline{120}$ b) $7 \cdot 6! = \underline{5040}$ c) $\dfrac{6!}{3!} = \underline{6 \times 5 \times 4} = 120$ d) $\dfrac{7!}{3!2!} = \dfrac{7 \times 6 \times 5 \times \overset{2}{4} \times 3}{3! \ 2!}$

3. Simplify the following expressions, where $n \in I$.

a) $\dfrac{(n + 1)!}{n!}$ b) $n(n - 1)(n - 2)!$ c) $\dfrac{(n + 4)!}{(n + 2)!}$ d) $\dfrac{(n - 1)!}{(n + 1)!}$

a) $\dfrac{(n+1)(n)!}{n!}$

$n!$

$\dfrac{(n+4)(n+3)(n+2)!}{(n+2)!}$

$\dfrac{(n-1)!}{(n+1)(n)(n-1)!}$

$n + 1$

$(n+4)(n+3)$
$n^2 + 3n + 4n + 12$
$n^2 + 7n + 12$

$\dfrac{1}{(n+1)(n)}$

$\dfrac{1}{n^2 + n}$

NUMERICAL RESPONSE

4. $\dfrac{n!}{\qquad} = 20$, where $n \in I$

$n+1$

NUMERICAL RESPONSE

$(n+4)(n+3)$

$n^2 + 3n + 4n + 12$

$n^2 + 7n + 12$

$\dfrac{1}{(n+1)(n)}$

$\dfrac{1}{n^2 + n}$

4. Solve the equation $\dfrac{n!}{(n-2)(n-3)!} = 20$, where $n \in I$.

TIP

Check each possible solution for n to decide whether all the factorials are defined.

$\dfrac{n(n-1)(n-2)(n-3)!}{(n-2)(n-3)!}$

$n(n-1) = 20$

$n^2 - n - 20 = 0$

$(n+4)(n-5) = 0$

$n = -4$ $\boxed{n = 5}$

$-+\_ = 20$

$\_\times\_ = 20$

$\wedge$

1   20

2   10

$\boxed{4-5}$

Check

$\dfrac{5!}{(5-2)(5-3)!} = 20$

$\dfrac{5!}{(3)(2)!} = 20$

$\dfrac{120}{6} = 20$ ✓

$20 = 20$

Dec 3-10:32 AM

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