Name: Richard

QUIZ 13 ♠

MATH 211
March 2, 2023

1. How many 4-element multisets can be made from the symbols $\{A, B, C, D\}$?

A's B's C's D's

$* \mid * \mid * \mid *$ ← list, length $4+3=7$, 3 bars

Ans: $\binom{7}{3} = \frac{7!}{4!3!} = \frac{7 \cdot 6 \cdot 5}{3 \cdot 2} = \boxed{35}$

2. In how many ways can 10 identical balls be placed into three boxes?

Box 1 Box 2 Box 3

$*** \mid *** \mid ****$ ← list, length $10+2=12$, 2 bars

Ans: $\binom{12}{2} = \frac{12!}{10!\,2!} = \frac{12 \cdot 11}{2} = \boxed{66}$

Name: Richard

QUIZ 13 ♢

MATH 211
March 2, 2023

1. How many 6-element multisets can be made from the symbols $\{A, B, C\}$?

A's B's C's

$** \mid ** \mid **$ ← list, length $6+2=8$, 2 bars

Ans: $\binom{8}{2} = \frac{8!}{6!\,2!} = \frac{8 \cdot 7}{2} = 4 \cdot 7 = \boxed{28}$

2. In how many ways can 15 identical balls be placed into three boxes?

Box 1 Box 2 Box 3

$***** \mid **** \mid ******$ ← list, length $15+2=17$, 2 bars

Ans: $\binom{17}{2} = \frac{17!}{15!\,2!} = \frac{17 \cdot 16}{2} = 17 \cdot 8 = \boxed{136}$

Name: Richard

QUIZ 13 ♣

MATH 211
March 2, 2023

1. How many 5-element multisets can be made from the symbols $\{A, B, C, D\}$?

A's B's C's D's

$** | * | * | *$ ← list, length $5+3=8$ with 3 bars.

Ans: $\binom{8}{3} = \frac{8!}{5!3!} = \frac{8 \cdot 7 \cdot 6}{3 \cdot 2} = \boxed{56}$

2. In how many ways can 8 identical balls be placed into three boxes?

Box 1 Box 2 Box 3

$*** | ** | ***$ ← list, length $8+2=10$, 2 bars

Ans $\binom{10}{2} = \frac{10!}{8!2!} = \frac{10 \cdot 9}{2} = \boxed{45}$

Name: Richard

QUIZ 13 ♡

MATH 211
March 2, 2023

1. How many 5-element multisets can be made from the symbols $\{A, B, C\}$?

A's B's C's

$** | ** | *$ ← list, length $5+2=7$, 2 bars.

Ans $\binom{7}{2} = \frac{7!}{5!2!} = \frac{7 \cdot 6}{2} = \boxed{21}$

2. In how many ways can 10 identical balls be placed into four boxes?

Box 1 Box 2 Box 3 Box 4

$*** | ** | *** | **$ ← list, length $10+3=13$

Ans $\binom{13}{3} = \frac{13!}{10!3!} = \frac{13 \cdot 12 \cdot 11}{6} = 13 \cdot 2 \cdot 11 = 13 \cdot 22 = \boxed{286}$