

$${}_{12}C_2 \times {}_{15}C_4$$

8. A math class has 12 boys and 15 girls. A group of six students is randomly selected to participate in a competition. If the group of 6 students must consist of exactly 2 boys and 4 girls, how many different groups can be formed?

8. C

- A) 1421 B) 45821 C) 90090 D) 4324320

9. Evaluate: $\binom{9}{4}$

$$= {}_9C_4 = \frac{9!}{4!5!}$$

9. C

- A) 118 B) 122 C) 126 D) 130

10. How many different arrangements can be made using all the letters in CALGARY if the first letter must be G?

$$\frac{1 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{2!} = \frac{6!}{2!}$$

10. B

- A) 120 B) 360 C) 480 D) 720

Constructed Response. Show all workings to receive full credit. (15 marks)

1. Ryder is going to purchase a new vehicle. He can choose from a truck, car or SUV; with manual or automatic transmission; in red, black or white. Draw a **tree diagram** and use it to determine **how many choices** he has for his new vehicle.

$$3 \times 2 \times 3 = 18$$



(2)

2. Find the number of permutations of the word **WINTER** if:

a) there are no restrictions? $6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 6! = 720$ (1)

b) the vowels must be kept together? $2! \cdot 5! = 2 \cdot 120 = 240$ (2)



3. How many ways can 5 cash prizes be awarded in a lottery that sold 100 tickets if each ticket

a) is not replaced? $\frac{100 \cdot 99 \cdot 98 \cdot 97 \cdot 96}{100 \cdot 5} = {}_P 5 = 9\,034\,502\,400$ (1)

b) is replaced? $100^5 = 10,000,000,000$ (1)

4. Algebraically solve for 'n': $\frac{(n+1) \cdot n!}{(n-1)!} = 20$ (4)

$$\frac{(n+1) \cdot n \cdot \cancel{(n-1)!}}{\cancel{(n-1)!}} = 20$$

$$(n+1)(n) = 20$$

$$n^2 + n - 20 = 0$$

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

$$n+5=0$$

$$n=-5$$

reject

$$n-4=0$$

$$n=4$$

5. There are 7 boys and 10 girls in a school travel club. A group of 5 is needed to set up an exhibit. How many different groups of 5 students with at least 3 girls are there to choose from? (4)

$$\begin{aligned} & 3G2B + 4G1B + 5G0B \\ & {}_{10}C_3 \times {}_7C_2 + {}_{10}C_4 \times {}_7C_1 + {}_{10}C_5 \times {}_7C_0 \\ & 120 \times 21 + 210 \cdot 7 + 252 \cdot 1 \\ & 2520 + 1470 + 252 \\ & = 4242 \end{aligned}$$