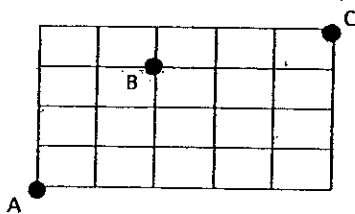


## Math Analysis II Honors Chapter 15 Test Review

1. In a survey of 52 rock "artists", 43 said that they have tattoos, while 24 said that they have body piercings. If 1 rock star does not have either tattoos or piercings, how many have ONLY tattoos?
2. Of the 50 cars at a custom car rally, 30 are low-riders, 28 have awesome air-brushing, and 16 are antique. 9 cars are antique low-riders with awesome airbrushing. 7 are only airbrushed, 9 are only low-riders, and 3 are only antique.
  - a) How many cars are low-riders with awesome airbrushing, but not antique?
  - b) How many cars don't have any of the three characteristics listed?
3.
  - a) How many 5-digit numbers contain no 2's or 5's?
  - b) How many 5-digit numbers start with an even number, end with an even number, and have no 7's in the middle position?
4. A group of reindeer consists of 9 deer, including Rudolph.
  - a) How many different sleigh teams of 6 can be chosen from this group?
  - b) How many different sleigh teams of 6 will not include Rudolph?
  - c) How many different arrangements of 6 can be chosen if the order in which a reindeer is hitched to the sleigh is important?
5. A soccer team has 8 forwards, 4 fullbacks, and 2 goalies on its roster. In how many ways can a scrimmage team consisting of a left forward, a left fullback, a goalie, a right fullback, and a right forward be formed?
6. Eight football players and eight cheerleaders are lined up for a pep rally.
  - a) How many different arrangements are possible?
  - b) How many arrangements are possible if the football players must stand together and the cheerleaders must stand together?
  - c) How many arrangements are possible if the players and the cheerleaders must alternate?
7. The Greasy Spoon Diner offers six different toppings for their mega-burgers. If they allow up to five toppings to be placed on a burger, how many different possible burgers can be ordered? Assume that order does not matter and you cannot repeat toppings. Explain your answer.

8. At an awards ceremony, there are 6 seniors, 9 juniors, 3 sophomores, and 2 freshmen receiving "Excellence in Mathematics" awards (It is another school since we would have many more receiving awards here)
- How many possible ways are there to seat these awardees?
  - How many ways are there if each grade level must be kept together?
  - How many ways are possible if just the seniors must be kept together and they must be seated first?
9. How many different arrangements can be made with the letters in
- MISSISSIPPI
  - BERGENTECHKNIGHTS
10. The grid shown represents the streets of Manhattan. A math teacher at point A has a date at point C, but wants to buy flowers first at point B. To get there as quickly as possible, he will always travel either North or East. How many different routes are there from A to B? from B to C? from A to C via B?



11. a) In how many ways can 9 different items be placed in a line?  
 b) In how many ways can 9 different items be arranged in a circle?  
 c) If 3 of the 9 items are identical, how many different linear arrangements are there of the 9 things.
12. Give the expansion for the binomial  $(p^3 - q^2)^6$
13. In the expansion of  $(3p - 2^2)^9$ , find the coefficients of the terms containing  $p^3$  and  $p^6$ .

1. 27

2. a) 10  
b) 8

3. a) 28,672  
b) 18,000

4. a) 84  
b) 28  
c) 60,480

5. 1,344

6. a)  $2.09 \text{ E } 13 = 16!$   
b)  $3,251,404,800 = 8!8!2!$   
c) 3,251,404,800

7. 63

8. a)  $2.43 \text{ E } 18 = 20!$   
b)  $7.52 \text{ E } 10 = 4!6!9!3!2!$   
c)  $6.28 \text{ E } 13 = 6!14!$

9. a) 34650

b)  $3.705 \times 10^{12}$

10. A to B  $\rightarrow$  10  
B to C  $\rightarrow$  4  
A to B via C  $\rightarrow$  40

11. a) 362,880  
b) 40,320  
c) 60,480

12.  $p^{18} - 6p^{15}q^2 + 15p^{12}q^4 - 20p^9q^6 + 15p^6q^8 - 6p^3q^{10} + q^{12}$

13.  $p^3 \rightarrow 84(3)^3(-2^2)^6 = 9,289,728$

$p^6 \rightarrow 84(3)^6(-2^2)^3 = -3,919,104$