California State University Sacramento - Math 101

Quiz #11

Name: Matthew Mendoza 8.5

1.5

1) Find the number of permutations of the letters in the given word.

(a) CATDOG

(b) ABBACATDOG

a) P^6_6

$\frac{n!}{(n-r)!} \Rightarrow \frac{6!}{0!} \Rightarrow \boxed{6!}$ ✓

b) -0.5 Combinations? No...

P^{10}_7 ← Feel like I'm doing something wrong

$\frac{10!}{(10-7)!} \Rightarrow \boxed{\frac{10!}{3!}}$

$\frac{10!}{3!2!}$

1.5

2) Find the number of pairs $\{a, b\}$ of distinct integers from the set $\{5, 6, 7, 8, \ldots, 20\}$ such that $|a - b| \leq 3$.

Unique ways

$17 \cdot 3$

$20 - 3 = 17$

when 18 there are two pairs: (18, 19), (18, 20)

when 19 we just have the one pair (19, 20)

So all together

13

$(17 \cdot 3) + 2 + 1$

$51 + 2 + 1$

$= 64$

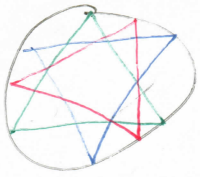
3

2

3) (a) n points are placed along the circle $x^2 + y^2 = 1$ in the x, y-plane such that distance between two consecutive points along the circle is the same. Find the number of ways to take the n points and choose 3 of them to form a triangle.

(b) The weight of a 0-1 sequence of the number in 1's in the sequence. For instance, 1010100 has weight 3. Find the number of 0-1 sequences of length 9 with weight at most two.

a)



n-many ways to draw a triangle, so

$\binom{n}{3}$

b) so.... and No More

$\binom{9}{0} + \binom{9}{1} + \binom{9}{2}$

4) In a class of 37 students, five students are chosen to form a focus group where the focus group has one leader, and two co-leaders. How many focus groups can be formed?

- 37 people
- 5 members in group
- 1 lead
- 2 coleads

Form the group: of 5 make admin.

$\binom{37}{5}$ $\binom{5}{3}$

of 3 make support.

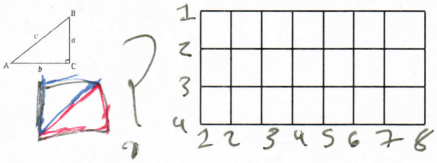
$\binom{3}{2}$

multiply

So All together

$\binom{37}{5} + \binom{5}{3} + \binom{3}{2}$

5) Given the grid below, find the number of right triangles whose vertices are intersection points in the grid, and the right angle of the triangle is the lower right corner of the triangle. What?



times 2 because ?

$\binom{4}{2}\binom{6}{2}$

Case 1x1

Need time to think

5.5