CSC175 Practice Assignment 2 Spring 2019 Name Solutions

Show Work!

1) You can buy the Chevy Cruze in eight colors, six trims (packages), and three wheel styles.

a) How many different Cruze are available? *8*6*3 = 144*

b) If two of the trims only allow two wheel styles, how many total choices are there?

*144 - 2*8 = 128 or 8*4*3+8*2*2 = 128*

c) If two of the trims only allow two wheel styles and two of the different trims allow only 5 of the colors, how many total choices are there? *8*2*2+5*2*3+8*2*3 = 110*

2) The coach of an intramural softball team needs to pick 5 men and 5 women to play the field from a roster of 9 men and 7 women. How many ways could this be done?

$C(9;5) * C(7;5) = {}_9C_5 * {}_7C_5 = \frac{9!}{4!5!} * \frac{7!}{2!5!} = 126 * 21 = 2646$ (Order doesn't matter)

3) A little girl has 6 American Girl dolls.

a) If she can only take two to Grandma's house, how many different ways can this be done?
(Order doesn't matter) ${}_6C_2 = \frac{6!}{4!2!} = \frac{6*5}{2*1} = 15$

b) If she wants to line them all up on her shelf, how many different ways can this be done?
(Order does matter) *6! = 720*

c) If she wants to line four of them up on her shelf, how many different ways can this be done?

(Order does matter) ${}_6P_4 = \frac{6!}{2!} = 6 * 5 * 4 * 3 = 360$

4) Everyone loves Old Country Buffet. Let's say they have six meat choices, five vegetable choices, three bread choices, three potato choices, and nine dessert choices. (Drinks are extra!)

a) If you only take one of each choice, how many meals can you create? *6*5*3*3*9 = 2430*

b) If you take two different meats, no vegetables, one bread, one potato, and three different desserts, how many meals can you create?

$${}_6C_2 * 3 * 3 * {}_9C_3 = \frac{6!}{4!\,2!} * 9 * \frac{9!}{6!\,3!} = 15 * 9 * 84 = 11340$$

5) List all partitions of the set $G = \{l, o, v, e\}$.

$$\left\{\begin{matrix}\{\{l\},\{o\},\{v\},\{e\}\},\{\{l,o\},\{v\},\{e\}\},\{\{l\},\{o,v\},\{e\}\},\{\{l\},\{o\},\{v,e\}\},\{\{l,e\},\{o\},\{v\}\},\{\{l,v\},\{o\},\{e\}\},\{\{o,e\},\{l\},\{v\}\},\\ \{\{l,o\},\{v,e\}\},\{\{l,e\},\{o,v\}\},\{\{l,v\},\{o,e\}\},\{\{l\},\{o,v,e\}\},\{\{o\},\{l,v,e\}\},\{\{v\},\{l,o,e\}\},\{\{e\},\{l,o,v\}\},\{l,o,v,e\}\end{matrix}\right\}$$

6) Is the set of all lines with slope of 2 but different y-intercepts a partition of the Cartesian plane? Why or why not? Yes, lines with slope 2 but different y-intercepts would never intersect and you could find a line with slope of 2 that would go through any point in the plane.

7) Use the binomial theorem to expand the following expressions. Must show all steps as shown on the class PowerPoint.

A) $(5x-2y)^3$

$$\binom{3}{0}(5x)^3(-2y)^0+\binom{3}{1}(5x)^2(-2y)^1+\binom{3}{2}(5x)^1(-2y)^2+\binom{3}{3}(5x)^0(-2y)^3$$

$$1*5^3x^3*1+3*5^2x^2*(-2)y+3*5x*(-2)^2y^2+1*1*(-2)^3y^3$$

$$125x^3-150x^2y+60xy^2-8y^3$$

B) $(3x+7)^4$

$$\binom{4}{0}(3x)^4 7^0+\binom{4}{1}(3x)^3 7^1+\binom{4}{2}(3x)^2 7^2+\binom{4}{3}(3x)^1 7^3+\binom{4}{4}(3x)^0 7^4$$

$$1*3^4x^4*1+4*3^3x^3*7+6*3^2x^2*7^2+4*3x*7^3+1*1*7^4$$

$$81x^4+756x^3+2646x^2+4116x+2401$$

8) What is the coefficient of the x^2y^5 term of the expansion of $(x+3y)^7$? Show work please.

$$\binom{7}{5}(x)^2(3y)^5$$

$$=\frac{7!}{2!*5!}x^2(3)^5y^5$$

$$=\frac{7*6*5*4*3}{5*4*3*2*1}x^2*243y^5$$

$$5103\,x^2y^5$$

9) A Master Lock can use the numbers from 0 to 39. Combinations are three number sequences. How many combinations are there if the first and third numbers must be odd, the second number must be even, and there is no repetition?

There are 20 odd and 20 even numbers, the last number can't be repeated: $20*20*19=7600$