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math 32-3D

Written HW #3

1) Party vs. Percentage

Mean: $\frac{33 + 20.5 + 12.6 + 10.7 + 9.2 + 8.9 + 6.1}{7}$

$$\frac{100}{7}$$

$$= 14.285\%$$

median: 5.1, 8.9, 9.2, 10.7, 12.6, 20.5, 33.0

$$10.7\%$$

2) Ends Won

Mean: $\frac{4, 4, 5, 10, 9, 1, 4}{7} = \frac{37}{7} = 5.2857$

Median: 1, 4, 4, 4, 5, 9, 10 = 4 ends won

3.) Wilfies mean & average

$$\text{mean: } \frac{2000, 8054, 1132, 649, 2019, 1743}{6} = \underline{\underline{1859.7}}$$

$\underline{\underline{1859.5 \text{ wildfires}}}$

$$\text{median: } 649, 1132, 1743, \cancel{2000}, \cancel{2019}, \cancel{8054}$$

$$\frac{1743 + 3743}{2} = \underline{\underline{1871.5 \text{ wildfires}}}$$

4.) Choose operator: $\binom{n}{k} = \frac{n!}{k!(n-k)!}$

a.) Compute $\binom{32}{3} = \frac{32!}{3!(32-3)!} = \frac{32!}{3!29!} = \frac{32 \cdot 31 \cdot 30}{3 \cdot 2 \cdot 1} \underline{\underline{29760}}$

Combination $= \frac{29760}{6} = \underline{\underline{4960}}$

b.) $\underline{\underline{0! = 1}}$

$n! = n \text{ factorial}$

$$C_{n,k} = \binom{n}{k} = C_{n,0} = \binom{n}{0} = 1$$

c.) Symmetry $\binom{n}{n-k} = \binom{n}{k} = 0$

binomial coefficient

$$0 \leq k \leq n$$

$$\binom{n}{k} = \frac{n!}{k!(n-k)!}$$

$$= \frac{n!}{(n-k)!(n-(n-k))!} = \binom{n}{n-k}$$

5.) Compute

a.) $\binom{0}{0} = 1$

b.) $\binom{1}{0} + \binom{1}{1} = 2$

c.) $\binom{2}{0} + \binom{2}{1} + \binom{2}{2} = 4$

d.) $\binom{3}{0} + \binom{3}{1} + \binom{3}{2} + \binom{3}{3} = 8$

e.) $\binom{4}{0} + \binom{4}{1} + \binom{4}{2} + \binom{4}{3} + \binom{4}{4} = 16$

f.) Pattern = $2^0, 2^1, 2^2, 2^3, 2^4, 2^5, \dots$ etc.

1	1	1	Pascal's
1	2	1	Triangle
1	3	3	1
1	4	6	4
1	5	10	10
1	6	15	15

$$\sum_{k=0}^n \binom{n}{k} = \binom{n}{0} + \binom{n}{1} + \dots + \binom{n}{n-1} + \binom{n}{n} = 2^n$$

g.) why $\sum_{k=0}^n \binom{n}{k} = 2^n$ ↑

$$(x+y)^n = \sum_{k=0}^n \binom{n}{k} x^{n-k} y^k = \sum_{k=0}^n \binom{n}{k} x^k y^{n-k}$$

Binomial
Theorem

6.) Probability -

Students grab packet - 81%.
random selection - 97%.
Probability of 2 students
sit first - ?

$$P(x=x) = \frac{100}{-81}$$

$$\binom{2}{0} (0.81)^x (-.19)^{7-x}$$

$$= P(x=2)$$

$$= \binom{2}{2} (0.81)^2 (-.19)^0 = \boxed{0.2973}$$

7.) Probability -

Parents help college students
w/ essay - 11%.

$$P(x=x) = \frac{100}{-11}$$

collected - 7 essays Prob
of 2 sub?

$$\binom{7}{x} (0.11)^x (0.89)^{7-x}$$

$$= P(x \leq 2)$$

$$= \binom{7}{0} (0.11)^0 (0.89)^7 + \binom{7}{1} (0.11)^1 (0.89)^6 + \binom{7}{2} (0.11)^2 (0.89)^5$$

$$\boxed{= 0.9669} \leftarrow$$

8. Probability -

children know the
difference - 35%.

$$P(x=x) = \frac{100}{-35}$$

tour group's children - 9 kids

$$\binom{9}{x} (0.35)^x (0.65)^{9-x}$$

Prob of
2 children - ?

$$= 1 - P(x \leq 1) =$$

$$= 1 - ((\binom{9}{0} (0.35)^0 (0.65)^9) + (\binom{9}{1} (0.35)(0.65)^8))$$

$$\boxed{= 0.8789}$$