

#1. Expand: $(a+b)^4$

$$= {}_4C_0(a)^4(b)^0 + {}_4C_1(a)^3(b)^1 + {}_4C_2(a)^2(b)^2 + {}_4C_3(a)^1(b)^3 + {}_4C_4(a)^0(b)^4$$

$$= 1(a^4)(1) + (4)(a^3)(b) + 6(a^2)(b^2) + 4(a)(b^3) + 1(1)(b^4)$$

$$= \boxed{a^4 + 4a^3b + 6a^2b^2 + 4ab^3 + b^4}$$

#2. Expand and simplify: $(2b-7c)^3$

$$= {}_3C_0(2b)^3(-7c)^0 + {}_3C_1(2b)^2(-7c)^1 + {}_3C_2(2b)^1(-7c)^2 + {}_3C_3(2b)^0(-7c)^3$$

$$= 1(8b^3)(1) + 3(4b^2)(-7c) + 3(2b)(49c^2) + 1(1)(-343c^3)$$

$$= \boxed{8b^3 - 84b^2c + 294bc^2 - 343c^3}$$

#3. Determine the coefficient of x^8y^5 in the expansion of $(2x^2-y)^9$ *add to 9.*

$${}_9C_4(2x^2)^4(-y)^5 = 126(16x^8)(-y^5)$$

$$= \boxed{-2016x^8y^5}$$

equal right exponent

#4. How many distinguishable permutations can be made with the letters in the word INNOCENCE.

$$\frac{9!}{3!2!2!} = \boxed{15120}$$

(N)(C)(E)

#5. How many ways can you choose a president, vice president, and secretary from a group of 30 people?

$$\frac{30}{P} \cdot \frac{29}{VP} \cdot \frac{28}{Sec} = \boxed{24360} \text{ or } {}_{30}P_3$$

#6. A science club has 15 boys and 18 girls. How many ways can a 5 member leadership council be formed from the members of this club if:

(a) There are no restrictions? *ignoring gender, there are 33 people:* ${}_{33}C_5 = \boxed{237,336}$

(b) The leadership council must contain 2 boys and 3 girls?

$$\frac{{}_{15}C_2 \cdot {}_{18}C_3}{\text{ways to choose boys} \cdot \text{ways to choose girls}} = \frac{105 \cdot 816}{85680}$$

#7. A computer program is written which randomly generates an integer between 1 and 10. The program is run twice and the two numbers it generates are added together. What is the probability that the sum of the two numbers is 5?

$\frac{10}{\text{outcomes}} \cdot \frac{10}{\text{outcomes}} = 100$ possible outcomes

ways to get sum = 5:

1+4
2+3
3+2
4+1

4 out of 100 $P(\text{sum}=5) = \frac{4}{100} = \boxed{.04 (4\%)}$

#8. A box holds 12 white, 5 red, and 6 black marbles. If 2 marbles are drawn from the box without replacement:

(a) What is the probability that they will both be black?

$$\frac{6}{23} \cdot \frac{5}{22} = \frac{30}{506} = \frac{15}{253} = 0.059$$

black 1st black 2nd

(b) What is the probability that they will be different colors?

ways this can happen: WR WB RW RB BW BR

$$\frac{12}{23} \cdot \frac{5}{22} + \frac{12}{23} \cdot \frac{6}{22} + \frac{5}{23} \cdot \frac{12}{22} + \frac{5}{23} \cdot \frac{6}{22} + \frac{6}{23} \cdot \frac{12}{22} + \frac{6}{23} \cdot \frac{5}{22} = \frac{162}{253} = 0.64$$

#9. A small business college has 800 seniors, 700 juniors, 900 sophomores, and 1200 freshman. If you stand outside the door of the student union, what is the probability that the next student who leaves the student union will be a junior?

$$\frac{700}{3600} = 0.194 \quad (\approx 19.4\%)$$

#10. A fruit merchant receives a shipping crate containing 30 peaches. The merchant doesn't realize that 5 of the peaches are rotten. If the merchant randomly picks 10 peaches to fulfill an order, what is the probability that exactly 2 of these 10 peaches will be rotten?

30 ways to get this outcome: 2 bad, 8 good total ways to pick 10 peaches

$${}^5C_2 \cdot {}^{25}C_8 = 10 \cdot 1081575 = 10815750$$

$${}^{30}C_{10} = 30045015$$

$$P(\text{ex 2 bad}) = \frac{10815750}{30045015} = 0.3598 \quad 36\%$$

#11. The probability that a student will pass their next math test is 85%, and the probability that they will pass their next English test is 90%. What is the probability that they will pass their next math test and not pass their next English test?

$$0.85 \cdot (1 - 0.90)$$

$$0.85 \cdot (0.10)$$

$$0.085 = 8.5\%$$

#12. One hundred people were surveyed about which airline they preferred. The results are shown in the table:

	American	Southwest	Other Airline	Total
Men	25	26	7	58
Women	16	21	5	42
Total	41	47	12	100

If a person is selected at random from these people:

(a) What is the probability the person is male and preferred Southwest?

$$\frac{26}{100} = 0.26 \text{ or } 26\%$$

(b) What is the probability the person is female given they preferred American?

$$\frac{16}{41} = 0.39 \text{ or } 39\%$$

#13. What is the probability that a number picked at random from this set will be odd?

{1, 2, 3, 4, 6, 8, 9}

$$\frac{3}{7} \text{ or } 0.4286$$

Precalculus
9.5-9.7 Review #1

Name: _____

Period: _____

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