Name: Key Date: _____

Probability Review

In a bowl of marbles, there are 5 red ones, 4 green ones, and 3 blue ones.

$\frac{8}{12} = \frac{2}{3}$ 1. If a marble is chosen at random from the bowl, find P(red one or a blue one)? 5 3

$\frac{15}{144} = \frac{5}{48}$ 2. If two marbles are chosen at random with replacement, find P(red and a blue)?

$P(r) \cdot P(b) = \frac{5}{12} \cdot \frac{3}{12} = \frac{15}{144}$

$\frac{20}{132} = \frac{5}{33}$ 3. If two marbles are chosen at random without replacement, find P(they are both red)?

$P(r) \cdot P(r|r) = \frac{5}{12} \cdot \frac{4}{11} = \frac{20}{132} = \frac{5}{33}$

A person rolls two dice, one after the other.

+	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

$\frac{24}{36} = \frac{2}{3}$ 4. P(even sum U sum of 7) $\frac{18}{36} + \frac{6}{36} =$

$\frac{27}{36} = \frac{3}{4}$ 5. P(odd sum U sum less than 8) $= P(\text{odd}) + P(<8) - P(\text{both})$ $\frac{18}{36} + \frac{21}{36} - \frac{12}{36} = \frac{27}{36}$

$\frac{5}{11}$ 6. What is the probability that the sum of two rolls is an even number **given** at least one of the rolls is a 3? → 11 rolls

A card is chosen from a standard deck of cards. The drawer is looking for clubs and face cards.

	Club	Not a Club	
Face card	3	9	12
Not a face card	10	30	40
	13	39	52

$\frac{39}{52} = \frac{3}{4}$ 7. Find P(Not a Club)

$\frac{3}{12} = \frac{1}{4}$ 8. Find P(Club | Face Card) 3 12

$\frac{9}{52}$ 9. Find P(Not a Club ∩ Face Card)

$\frac{22}{52} = \frac{11}{26}$ 10. Find P(Club ∪ Face Card) $= P(\text{Club}) + P(\text{FC}) - P(\text{both})$ $\frac{13}{52} + \frac{12}{52} - \frac{3}{52} = \frac{22}{52}$

Yes 11. Are the events Club and Face Card Independent of each other?

If so, ...

$P(\text{Club and FC}) = P(\text{Club}) \cdot P(\text{FC})$

from table → $\frac{3}{52} = \frac{13}{52} \cdot \frac{12}{52}$

$\frac{3}{52} = \frac{3}{52}$ ✓ So, Yes

or

$.0576923077 = .0576923077$ ✓

In a survey of 430 people, 220 of whom are female, it was found that 210 prefer chocolate ice cream including 90 males. Use this information to complete the table below.

	Males	Females	
Vanilla	120	100	220
Chocolate	90	120	210
	210	220	430

Find each of the following probabilities:

$\frac{220}{430} =$ 12. The person likes vanilla.

$\frac{100}{220} =$ 13. The person like vanilla, given they are female. → 220 females

$\frac{310}{430} = \frac{31}{43}$ 14. The person likes vanilla or is a male. $= P(\text{Van}) + P(\text{male}) - P(\text{both})$ $\frac{220}{430} + \frac{210}{430} - \frac{120}{430} = \frac{310}{430}$

No 15. Are being a male and liking chocolate independent events?

$P(\text{male AND Choc}) = P(\text{male}) \cdot P(\text{choc})$?

$\frac{90}{430} = \frac{210}{430} \cdot \frac{210}{430}$ $.2093023.. \neq .2385073012$ NO

.06 16. The probability of a randomly chosen boy playing basketball is 0.29. The chance that a boy plays basketball or football is 0.58. The chance that a boy plays football is 0.35. What is the probability that a randomly chosen boy plays both basketball and football?

$P(\text{BB or FB}) = P(\text{BB}) + P(\text{FB}) - P(\text{both})$

$.58 = .29 + .35 - x$ $x = .06$

$.\overline{3}$ 17. Assume that the following events are dependent:

- The probability that a high school student eats breakfast is 0.6.
- The probability that a high school senior will eat breakfast and get over 6 hours of sleep is 0.2.

What is the probability that a high school senior will get over 6 hours of sleep, given that the person ate breakfast?

$$P(A|B) = \frac{P(A \text{ and } B)}{P(B)}$$

$$P(>6\text{hr} \mid \text{bfast}) = \frac{P(>6\text{hr AND bfast})}{P(\text{bfast})}$$

$$= \frac{.2}{.6}$$

$$= .\overline{3}$$