Final Review Part 2
  CH 7— Probability   Name: _____ Period: ___

1. If you flip a coin twice and then roll a die, how many possible outcomes are there?

   2: H,T   6: 1,2,3,4,5,6   2·2·6 = 24 OUTCOMES

2. If you flip a coin five times in a row, how many possible outcomes will there be?

   2·2·2·2·2 = 32 OUTCOMES

3. A die is tossed. What is the probability of tossing a 2 given that the number tossed was an even number? $P(2|EVEN) = \boxed{\dfrac{1}{3}}$
   ↑   ↑
   2   2,4,6

                                                        ↗ (1,1)(2,2)(3,3)(4,4)(5,5)(6,6)

4. Two dice are rolled. What is the probability of both of the dice being the same number?

   └ 6 POSSIBILITIES ON EACH: 6·6 = 36 POSSIBLE OUTCOMES
   $P(DOUBLES) = \dfrac{6}{36} = \boxed{\dfrac{1}{6}}$

                                                                    ≥10
5. If you toss a pair of dice, what is the probability that the sum of the two numbers will be *more than 9?*

   (4,6)(5,5)(5,6)(6,6) $P(>9) = \dfrac{6}{36} = \boxed{\dfrac{1}{6}}$
   (6,4)   (6,5)

6. If the probability of an event is 3/8, what is the probability that this event won't occur?

   $1 - \dfrac{3}{8} = \dfrac{8}{8} - \dfrac{3}{8} = \boxed{\dfrac{5}{8}}$ ⟵ FAVORABLE
                                                     ⟵ TOTAL

7. If the probability of an event occurring is 1/8, what are the **odds** that it won't happen?

   ODDS TO HAPPEN: 1:7   ODD TO NOT HAPPEN: $\boxed{7:1}$
           FAV. : UNFAV.

8. If the odds of an event are 9:20, find the probability the event occurs.

   TOTAL = 9+20 = 29
                        $P(E) = \boxed{\dfrac{9}{29}}$

   A bag contains 30 marbles with 3 white, 15 blue and 12 green ones.
   9. If you reach into the bag and draw out marbles one at a time until you have three in your hand, what is the probability that they are all blue? (WITHOUT REPLACING) ⟵

   $\left(\dfrac{15}{30}\right)\left(\dfrac{14}{29}\right)\left(\dfrac{13}{28}\right) = \dfrac{\left(\cancel{15}\right)\left(\cancel{14}\right)\left(13\right)}{\cancel{30}\,\cancel{29}\,\cancel{28}} = \dfrac{13}{2·29·2} = \boxed{\dfrac{13}{116}}$

   10. If you reach into the bag and draw out one marble at a time and record the color before *replacing it* to draw the next marble. What is the probability that they are all blue if you draw three marbles?

   $\left(\dfrac{15}{30}\right)\left(\dfrac{15}{30}\right)\left(\dfrac{15}{30}\right) = \dfrac{1}{2}\left(\dfrac{1}{2}\right)\dfrac{1}{2} = \boxed{\dfrac{1}{8}}$

Seventy students were asked if they enjoyed watching soccer on TV. Use the table to find the probabilities below: (Give answers as exact fractions – then convert to a percent and round each percentage to the tenths place. Give odds in reduced ratio form.)

	Enjoy	Do Not Enjoy	Total
Male	24	14	38
Female	22	10	32
Total	46	24	70

11. P(do not enjoy) = $\frac{24}{70} = \frac{12}{35} = \boxed{34.3\%}$

12. P(female and enjoy) = $\frac{22}{70} = \frac{11}{35} = \boxed{31.4\%}$

13. P(enjoy | female) = $\frac{22}{32} = \frac{11}{16} = \boxed{68.8\%}$
↑
"GIVEN THAT"-CONDITIONAL PROBABILITY (CHANGES TOTAL)

14. Odds in favor that they enjoy watching soccer
FAVOR : UNFAVOR.   46:24
$\boxed{23:12}$

15. A Social Security number is a code made up of 3 digits - 2 digits - 4 digits.
   a. How many different social security numbers would be possible if any number can be used with repetition? $10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 = 10^9$
   $= \boxed{1,000,000,000}$ 1 BILLION

   b. If repetition of numbers were *not* permitted in social security numbers, how many different numbers would be possible? $10 \cdot 9 \cdot 8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 = \boxed{3,628,800}$
   $10!$

   c. The first three digits are assigned based on what state you live in when applying to get your card, so you do not really get a choice on the first three digits. What if the next digit could not be a zero, and no repetition of numbers is allowed - how many different social security numbers would be possible? $XXX \cdot 9 \cdot 9 \cdot 8 \cdot 7 \cdot 6 \cdot 5 = \boxed{136,080}$ FIRST 9 IS FOR 1-9
   2nd 9 IS FOR 0+8 OF THE 1-9
(VAGUE- I'M APPLYING IT TO THE LAST 6 NUMBERS ONLY)

16. In how many ways can you arrange the batting order for nine baseball players out of 15 players?
$_{15}C_9 = \frac{15!}{(15-9)!\,9!} = \frac{15 \cdot 14 \cdot 13 \cdot 12 \cdot 11 \cdot 10 \cdot 9!}{6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 \cdot 9!} = \frac{7 \cdot 13 \cdot 11 \cdot 5}{1} = 5,005$

17. A combination bicycle lock is made from one letter followed by three numbers and then one letter. Find the number of possible codes if the letters used are A-F and the numbers used are 1-6. All numbers and letters may be repeated.   6 LETTERS
$6 \cdot 6 \cdot 6 \cdot 6 \cdot 6 = 6^5$
$= \boxed{7,776}$

18. It is estimated that two out of 12 students drop a class during a semester. What are the odds that you will drop a class? $\frac{2}{12} = \frac{1}{6}$ FAV. TOTAL $\boxed{1:5}$
FAV. : UNFAV.

19. $100, $50, $20, and $5 prizes are to be awarded to four different people. If ten people are being considered for the prizes, how many different arrangements are possible?
$_{10}P_4 = \frac{10!}{(10-4)!} = \frac{10!}{6!} = \frac{10 \cdot 9 \cdot 8 \cdot 7 \cdot 6!}{6!} = \boxed{5,040}$

20. A bag contains four red balls, seven white balls and eight blue balls. If three balls are selected at random, with replacement, find the probability that they are all red.

$4+7+8=19$

$$\left(\frac{4}{19}\right)\left(\frac{4}{19}\right)\left(\frac{4}{19}\right)=\boxed{\frac{64}{6859}}$$

21. At a car rental agency, the agent has 10 identical midsized cars on his lot and six people have reserved midsized cars. In how many different ways can the six cars to be used be selected?

$$_{10}C_6 = \frac{10!}{(10-6)!\,6!} = \frac{10!}{4!\,6!} = \frac{10\cdot9\cdot8\cdot7\cdot6!}{4\cdot3\cdot2\cdot1\cdot6!} = 10\cdot3\cdot7 = \boxed{210}$$

Review CH 8 — Statistics

1. Find the standard deviation for the data: 7, 2, 9, 3, 10, 6

$$s = \sqrt{\frac{\Sigma(x-\bar{x})^2}{n-1}} \qquad z = \frac{x-\bar{x}}{s}$$

$$\bar{X} = \frac{7+2+9+3+10+6}{6} = \frac{37}{6} = 6.16$$

$\bar{x} = \underline{6.17}$

X	$x-\bar{x}$	$(x-\bar{x})^2$
7	0.833	0.694
2	-4.167	17.364
9	2.833	8.026
3	-3.167	10.030
10	3.833	14.692
6	-0.167	0.0278
TOTALS	0.000	50.833

$s = \underline{3.19}$

$$S = \sqrt{\frac{50.833}{(6-1)}}$$

$$S = \sqrt{\frac{50.833}{5}}$$

$$S = \sqrt{10.167}$$

$$S \approx 3.1885$$

2. The scores from all of the statistics test were normally distributed with a mean of 76 and a standard deviation of 8.

$$z = \frac{x-\bar{x}}{s}$$

a) What would your z-score be if you scored an 86 on the test?

$$z = \frac{86-76}{8} = \frac{10}{8} = \frac{5}{4} = \boxed{1.25}$$

b) What would your z-score be if you scored a 66 on the test?

$$z = \frac{66-76}{8} = \frac{-10}{8} = -\frac{5}{4} = \boxed{-1.25}$$

c) What would your test score be if you had a z-score of 2.1?

$$8(2.1) = \left(\frac{x-76}{8}\right)8$$

$$16.8 = x-76$$
$$\underset{+76}{} \qquad \underset{+76}{}$$
$$92.8 = x \qquad \boxed{92.8}$$

d) What would your test score be if you had a z-score of -1.8?

$$8(-1.8) = \left(\frac{x-76}{8}\right)8$$

$$-14.4 = x-76$$
$$61.6 = x \qquad \boxed{61.6}$$

3. Find the 7 missing numbers that have: Mean = 100, Median = 100, Mode = 50 and Range = 150
Support your work by showing how your numbers meet the criteria.

MEAN = 100

$\begin{array}{r} 100 \\ \times 7 \\ \hline \text{TOTAL} = 700 \end{array}$

$\begin{array}{r} 300 \\ -50 \\ \hline 250 \div 2 = 125 \end{array}$

$\begin{array}{r} 700 \\ -400 \\ \hline 300 \end{array}$ TO SPLIT BETWEEN #3,5 + 6

50 50 50 100 125 125 200

SUM = 400

RANGE = 200-50 = 150

MANY ANSWERS, LIKE: 50, 50, 75, 100, 110, 115, 200