F.S.T. **Name _____**
Chapter 7 Review **Block _____ Date _____**

Non-Calculator

1. What is the probability that, on a six sided die, you will roll:
   a) a four b) a seven c) an integer

2. In a three-child family, what is the probability of exactly one child is a boy?

3. List the sample space for rolling two 4 sided dice.

4. State the difference between relative frequency and probability. What does a relative frequency of 0 mean?

5. If the probability of being right handed is 5/8, then what is the probability of being left-handed? How are the events "right-handed" and "left-handed" related?

6. State whether the events are mutually exclusive, complementary, or not mutually exclusive.
   a. A: Being male
      B: Being female
   b. A: Snow
      B: No snow
   c. A: Being over 6 feet tall
      B: Being under 5 feet tall
   d. A: A sum of 7 on two dice
      B: The first die showing 4
   e. A: An A on this test
      B: A B on this test
   f. A: An A on this test
      B: A B on the next test

7. Write an expression for the number of different batting orders there are for the 9 starters of the Seattle Mariners baseball team?

8. Solve $\frac{8!}{x} = 6!$

9. Solve 0!

10. Write ${}_{17}P_5$ as a ratio of two factorials and as a product of integers.

11. Write ${}_{10}C_3$ as a product of integers.

12. Evaluate ${}_7C_3$.

Calculator Allowed

13. a) How many possible outcomes are there if you flip a coin 20 times?
b) What is the probability of all heads?

14. If a researcher finds that 242 out of 700 people taking an experimental drug lose their eyebrows, what is the relative frequency of eyebrow loss?

15. Suppose $P(A) = 0.2$, $P(B) = 0.7$ and $P(A \cup B) = 0.1$ Find $P(A \cap B)$. Are *A* and *B* mutually exclusive? Explain your answer.

16. Thirteen of the fifty states include land west of the continental divide, and 42 states include land east of the continental divide. How many states contain land both east and west of the continental divide?

17. A pre-election poll suggests that the probability of the republican candidate winning is 0.42, and the probability the democratic candidate will win is 0.47. Find the probability the third party candidate will win.

18. At the Chinese cafe, you can choose from three different kinds of rice, six different kinds of meat, 8 different kinds of vegetable, and 6 different drinks. How many different meals could you select?

19. Evaluate 16!

20. If you want to list your top three choices in order for colleges in Colorado would you use combination or permutation?

21. If you want to pick your three favorite cars from among 20 models, how many different ways could you select them?

22. a) How many ways can you answer a 10 question True/False test?
b) What is P(getting all answers correct)?

23. How many ways can you answer a six question matching test if there are six possible answers and each answer may only be used once?

24. If you randomly pick 7 students from a class of 22, how many different ways could you pick them?

25. If you want to pick 1^{st}, 2^{nd} and 3^{rd} places in a race with 8 sprinters, how many different ways could you pick them?

26. a) How many 10 digit pass codes are there without repeats?
b) How many 10 digit pass codes are there with repeats?

27. Solve ${}_nP_5 = 7 \bullet {}_nP_4$

28. Solve (n-2)! = 12 (n-4)!

29. A drawer has 3 red socks and two blue socks.
a) If you pick a sock replace it, and pick another sock, what is the probability they will both be red?
b) If you pick a sock, put it on, then pick another sock, what is the probability both your socks will be blue?
c) If you pick a sock, put it on, then pick another sock, what is the probability that the first sock is red and the second sock is blue?

30. State whether the events are independent or dependent?
a) You flip heads on a coin and roll a four on a six sided die
b) The probability of red hair is 0.2, the probability of fair skin is 0.3 and the probability of both is 0.1
c) You pick a card from a standard deck, throw it away, then pick another card
d) You pick a card from a standard deck, return it, then pick another card

31. You are about to take a social studies quiz that consists of 12 multiple choice questions. Each question has 4 possible choices. You haven't studied and are going to have to randomly guess at every single question.
a) What is the probability that you will get exactly 7 of the 12 questions correct?
b) What is the probability that you will get less than 2 questions correct?

32. The duration of a certain operation at a local hospital has a normal distribution. The average time for the operation is 115 minutes and has a standard deviation of 10 minutes.
a) What percentage of operations last less than 128 minutes?
b) What percentage of operations last between 120 and 130 minutes?

33. The average gas mileage of compact cars is normally distributed with a mean of 25 mpg and a standard deviation of 4 mpg.
a) Find the probability that a car gets less than 17 mpg.
b) Find the probability that a car gets between 17 and 29 mpg.

Anything from the chapter 1 test is fair game!!!!

F.S.T. Chapter 7 Answer Key

Non-Calculator

1. a) $\frac{1}{6}$ b) 0 c) 1

2. $\frac{3}{8}$

3. $\{(1,1),(1,2),(1,3),(1,4)$
$(2,1),(2,2),(2,3),(2,4)$
$(3,1),(3,2),(3,3),(3,4)$
$(4,1),(4,2),(4,3),(4,4)\}$

4. Relative frequency is experimentally determined; RF of 0 has not happened yet but could still occur. Probability is theoretically determined, P of 0 means it cannot happen.

5. $\frac{3}{8}$, complementary

6. a) complementary b) complementary
c) mutually exclusive d) not mutually exclusive
e) mutually exclusive f) not mutually exclusive

7. 9! = 362,880
8. x = 56
9. 1
10. $\frac{17!}{12!}$ or $17 \cdot 16 \cdot 15 \cdot 14 \cdot 13 = 742{,}560$
11. $10 \cdot 4 \cdot 3$ or $5 \cdot 8 \cdot 3$
12. 35

Calculator Allowed

13. a) $2^{20} = 1{,}048{,}576$ b) $\frac{1}{1{,}048{,}576}$

14. $\frac{121}{350} \approx 34.6\%$

15. $P(A \cap B) = 0.8$. A and B are not mutually exclusive, if they were $P(A \cap B)$ would be 0.

16. 5 states
17. 0.11
18. 864
19. 2.09×10^{13}
20. Permutation
21. ${}_{20}C_3 = 1140$
22. a) $2^{10} = 1024$ b) $\frac{1}{1024}$
23. 6! = 720
24. ${}_{22}C_7 = 170{,}544$
25. ${}_8P_3 = 336$
26. a) 10! = 3,628,800 b) $1 \times 10^{10} = 1{,}000{,}000{,}000$
27. n = 11
28. n = 6
29. a) $\frac{9}{25}$ b) $\frac{1}{10}$ c) $\frac{3}{10}$
30. a) Independent b) Dependent
c) Dependent d) Independent
31. a) ${}_{12}C_7 (.25)^7 (.75)^5 \approx 0.01147$
b) $(.75)^{12} + {}_{12}C_1 (.25)^1 (.75)^{11} \approx 0.15838$
32. a) P ($z < 1.3$) = .9032
b) P ($.5 < z < 1.5$) = .2417
33. a) 2.5%
b) 81.5%