MATH 141 (Extra Practice 3)

1. A survey was conducted of 475 students living in dorms at Texas A&M. There were 327 students who said they had a refrigerator in their dorm room, 186 said they had a microwave in their dorm room, and 30 who said they did not have a refrigerator nor a microwave in their dorm room. What is the probability a student selected at random had BOTH a refrigerator and a microwave in their dorm room?

2. Let $S = \{a, b, c, d, e, f\}$ with $P(a) = 0.1, P(b) = 0.2, P(c) = 0.25, P(d) = 0.15$, and $P(e) = 0.12$.

   (a) Find $P(f)$

   (b) If $E = \{a, b, f\}$ find $P(E)$.

   (c) If $F = \{b, c, d\}$ find $P(F)$.

3. Over a number of years the grade distribution in a mathematics course was observed (results below). What is the probably of someone passing this class (making a C or higher)?

A	B	C	D	F
15	24	38	21	13

4. An experiment consists of rolling two fair 6-sided dice at the same time, and recording the uppermost numbers. What is the probability a sum of 3 is rolled, or one of the dice shows a 2?

5. Let E and F be subsets in sample space, S, with $P(E) = 0.49, P(F) = 0.44$, and $P(E \cap F) = 0.12$. Find $P(E^c \cap F^c)$.

6. A survey was conducted of 120 students on whether or not they read the last two books in the Twilight series: Eclipse and Breaking Dawn. Nineteen students had read neither book, while 89 students had read Breaking Dawn and 96 students had read Eclipse. What is the probability a student read both books?

7. Let E and F be two events of the same sample space. If $P(E) = 0.55, P(F) = 0.7$, and $P(E \cap F^c) = 0.25$, find $P(E \cap F)$.

8. Let E and F be mutually exclusive events of the same sample space. If $P(E^c) = 0.3$ and $P(F) = 0.15$, find $P(E^c \cap F^c)$.

9. A company believes it has a probability of 0.45 of receiving a contract. What are the odds that it will receive a contract?

10. There are 12 multiple choice questions on an exam in which each question has 5 answers. If Laura knows the answer to 8 of them, and randomly guesses at the remaining 4, what is the probability she will answer all 12 questions correctly?

11. An experiment consists of rolling a 9-sided die (numbered 1-9) and observing the number on top. Let E be the event that an odd number is rolled. Let F be the event that the number is greater than 5.

(a) Are the events E and F mutually exclusive?

(b) Are the events E and F independent?

12. Morgan counts the number of chocolate chips per cookie in a box and finds:

# of chips	6	8	9	10	11	12
# of cookies	2	9	13	7	14	3

(a) What is X (# no. of chips or # of cookies)?

(b) Find Mode of X

(c) Find Median of X

(d) Find Standard deviation of X

(e) Find the expected number of chips in a cookie from this box.

13. A customer at a DVD store selects four DVDs from a stack of 25 in which 6 are scratched. What is the probability the customer selects at least 3 DVDs that are NOT scratched?

14. Use the table below to find the following: mean, standard deviation, variance, median, and mode.

x	3	5	8	14
Frequency	15	34	26	25

15. At a school cafeteria, 400 students ate bad meat. The probability of getting food poison from bad meat is 30%.

(a) What is the probability at most 100 students get sick?

(b) What is the probability at least 100 students get sick?

(c) What is the probability that between 120 and 180 students get sick (inclusive)?

(d) How many students can you expect to get sick?

16. In a group of 30 items on a shelf in Target store, 2 are known to be defective. If a customer selects 3 of these items, what is the probability that at least 1 is defective?

17. Classify the following random variables as finite discrete, infinite discrete, or continuous. Give the values of the random variables.

(a) A box contains 3 white, 6 purple, and 4 yellow items. Items are drawn one at a time without replacement until a white one is drawn. Let X denote the number of items drawn in one trial of this experiment.

(b) Let X be the temperature, in degrees Celsius, of a cup of hot tea.

(c) Let X be the number of times you roll a dice until a 5 appears.

18. The table below shows the all the grades for a certain instructor's class over the last year. If a student takes this class, what is the probability that the student passes (assuming D's and F's are failing)?

Grade	A	B	C	D	F
Freq.	9	18	24	11	6

19. Philip pays a premium of \$250 for a 3-yr-term insurance policy on his new TV set. If something happens to the TV set, then the insurance company will pay him \$3000 to replace it. If there is a 7% chance he will need to replace the TV set within 3 years, how much money can the insurance company expect to make/lose on this premium.

20. A game costs \$2.00 to play and it consists of rolling a 10-sided die one time. If the die lands on a 9, you win \$5. If it lands on a 1 or 8, you win \$3. If it lands on a $2, 3$, or 4, you win \$1. For any other result, you lose. How much can a person expect to win/lose if they play this game?

21. The probability that a person will be color blind is 0.038. What is the probability that in a group of 47 persons, at most 2 are color-blind?

22. Toss a fair coin 20 times. What is the probability of getting:

    (a) exactly 4 heads

    (b) more than 10 heads

    (c) at most 15 heads

    (d) between 12 and 18 heads.

23. A box of 24 pens contains three broken ones. If Mark selects 8 pens at random without replacement, what is the probability that shell get at exactly 1 broken pen?

24. Laura sells magazine subscriptions over the phone. She estimates that the probability of her making a sale with each attempt is 0.12. What is the probability of Laura making more than 10 sales if he makes 80 calls?

25. A box contains 700 small gadgets, 240 of which are cracked. If you randomly select 100 gadgets, what is the probability at least 1 is cracked? JUST SET UP THE PROBLEM

26. At a certain college, the rate of graduation is 64%. In a class of 1800 students, what is the expected number of students who will NOT graduate?

27. The odds in favor of Emily remembering to do Suggested Homework problems are 2 to 10. What is the probability she forgets and does not do the homework?

28. An experiment consists of randomly selecting one of three coins, tossing it, and observing the outcome - heads(H) or tails(T). The first coin is a fair coin, the second coin is a biased coin such that $P(T) = 0.15$, and the third coin is a two headed coin

    (a) What is the probability the coin lands on tails?

    (b) Given that the coin landed on heads, what is the probability it was the fair coin?

29. A weighted coin (the probability it lands on heads is 0.63) is flipped 70 times. What is the probability of the coin landing on TAILS at least 20 times?

30. A quiz consists of 4 TRUE/FALSE questions.

    (a) In how many different ways can a person complete this quiz if every question is answered?

(b) What is the probability distribution for the number of correct answers?

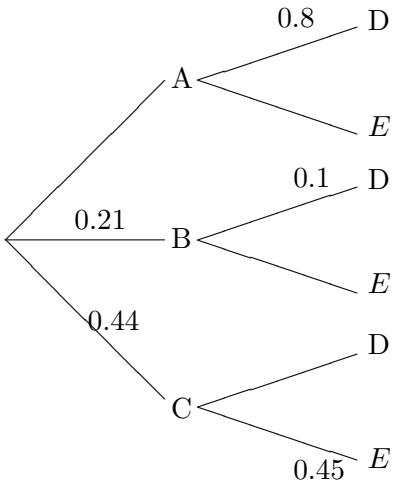
31. Random drug tests were administered to 1200 high school athletes across the state. Among the 696 girls tested, 14% of them failed the first drug test. Whereas, 27% of the boys failed their first drug test. What is the probability a randomly selected student

    (a) passed their first drug test?

    (b) Was a boy, given they failed their first drug test?

    (c) If a student failed the first drug test, they were given a second random test later that year. Of those given the 2nd test, 5% of the girls failed it, while 13% of the boys failed it. What is the probability a student failed the test twice?

32. Using the tree diagram below, answer the following:



    (a) $P(D) =$

    (b) $P(B \cap E) =$

    (c) $P(C \cup D) =$

    (d) $P(A|E) =$

    (e) $P(E|C) =$

33. From a pool of 120 male and 80 female applicants, 36 males and 28 females are admitted to a certain program. Draw a tree diagram representing this scenario and label the exact probability of each branch.