http://www.foxtrot.com

LAST NAME:_____      FIRST NAME:_____

UIN: _____      EXAM SEAT NUMBER: _____

"An Aggie does not lie, cheat, or steal or tolerate those who do"

On my honor as an Aggie, I have neither given nor received unauthorized aid on this exam.

SIGNATURE:_____

- Read and follow all instructions and read each question carefully.

- Each question is worth 4 points, for a total of 100 points, plus 2 points for filling out your Scantron form correctly.

- Put your name on your Scantron form as **last name, first name**. In the **Test No.** box fill in the exam version from the top right of this page. It is 3A or 3B for this exam.

- You may not start this exam until the starting time is called. You must put your pencils down when the ending time is called. Starting the exam before time is called or refusing to stop when time is called is considered **Academic Dishonesty**.

- Mark the correct answer on your Scantron form, and on this exam. **Scantrons will not be returned.**

- You may not collaborate with your neighbors on this exam.

- The only things on your desk and in sight are pencils, erasers, calculator (without a case) student ID. Your student ID must be out on your desk. **No hats, no sunglasses, no wallets, no cellphones, no calculator cases.**

- Everything else should be put away in your backpack or bag and put underneath your desk. If you do not have a backpack or bag to stow things in, you must put your things at the front or back of the classroom, away from your desk.

- In particular, your cellphone must be turned off and put away during this exam.
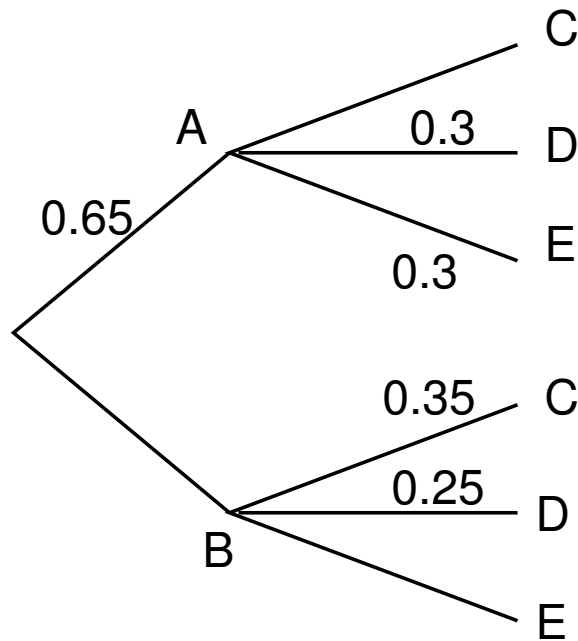
- GOOD LUCK!!!!!!!

1. A fair six-sided die is rolled 3300 times. What is the mean number of times a one will come up on top? What is the standard deviation?

   (a) mean = 550; std. dev = 458.33

   (b) mean = 550; std. dev = 21.41

   (c) mean = 550; std. dev = 23.45

   (d) mean = 1100; std. dev = 23.45

   (e) mean = 1100; std. dev = 458.33

---

**Complete the given tree and use it to answer the next three questions.**

2. $P(C|A) =$

   (a) 0.2560

   (b) 0.6797

   (c) 0.4000

   (d) 0.7725

   (e) none of these



3. $P(B|D) =$

   (a) 0.3097

   (b) 0.0875

   (c) 0.5450

   (d) 0.2500

   (e) none of these

4. $P(B \cup E)$

   (a) 0.1400

   (b) 0.4000

   (c) 0.4179

   (d) 0.5450

   (e) none of these

**Use this information for the next three questions.**

iTunes surveyed a group of people to determine the number of songs they purchase monthly. The results are given in the table.

| Age | 0 | 1 | 2 | 3+ | Totals |
|---|---|---|---|---|---|
| Under 13 | 10 | 60 | 20 | 0 | 90 |
| 13-24 | 10 | 70 | 50 | 20 | 150 |
| Over 24 | 30 | 50 | 50 | 40 | 170 |
| Totals | 50 | 180 | 120 | 60 | 410 |

A person from the survey is selected at random.

5. What is the probability that a person who is over 24 purchases 3 or more songs monthly?

   a) 0.6667

   b) 0.4634

   c) 0.2353

   d) 0.0976

   e) none of these

6. What is the probability that a person who purchases 2 songs monthly is 24 years old or younger?

   (a) 0.5833

   (b) 0.2917

   (c) 0.1707

   (d) 0.4167

   (e) none of these

7. What is the probability that the person is under 13 or purchases 1 song monthly?

   (a) 0.6585

   (b) 0.1463

   (c) 0.3333

   (d) 0.5122

   (e) 0.6667

8. Use the following probability distribution and events below to determine the truth or falsehood of the following statements. The sample space is $S = \{$a, b, c, d, e$\}$

| outcomes | a | b | c | d | e |
|----------|------|------|------|---|------|
| Probability | 0.19 | 0.21 | 0.25 | | 0.15 |

$$E = \{a, c, d, e\} \quad F = \{b, d, e\} \quad G = \{a, b, d\}$$

I. $P(S) = 0.8$     II. $P(E) = 0.79$     III. $P(F \cup G) = 0.75$

(a) only I is TRUE

(b) only II is TRUE

(c) only III is TRUE

(d) only II and III are TRUE

(e) I, II and III are FALSE

9. There are 50,000 bridges in Texas. If each bridge has the same probability of collapsing in a given year, with this probability equal to $1.2 \times 10^{-6} = .0000012$, what is the probability of having exactly 2 bridge collapses in Texas in one year?

(a) 0.999966

(b) 0.098786

(c) $3.44163 \times 10^{-5}$

(d) 0.001730

(e) 0.001695

10. What is the probability that in a class of 32 unrelated students at least two have the same birthday? Assume there are exactly 365 days in a year.

(a) 0.2466

(b) 0.4114

(c) 0.5687

(d) 0.7063

(e) 0.7533

4

11. A single card is drawn at random from a standard deck of 52 cards. What is the probability that the card is a Queen or a red card?

   (a) $\dfrac{1}{52}$

   (b) $\dfrac{1}{2}$

   (c) $\dfrac{7}{13}$

   (d) $\dfrac{27}{52}$

   (e) none of these

12. 35% of students re-work problems they got wrong in Math 141. 32% of the students in Math 141 regularly attend the Week-in-Review. 60% of students do neither of these two things. What is the probability of a student chosen at random regularly attending the Week-in-Review and reworking problems?

   (a) 0.112

   (b) 0.27

   (c) 0.30

   (d) 0.37

   (e) 0.40

13. A fair six-sided die is rolled. The number that comes up is recorded unless it is a one. If the one is rolled, the die is rolled again and the sum of the one and the second number is recorded. What is the probability of recording a three?

   (a) $\dfrac{1}{2}$

   (b) $\dfrac{1}{3}$

   (c) $\dfrac{1}{6}$

   (d) $\dfrac{1}{12}$

   (e) $\dfrac{7}{36}$

14. A box contains 8 yellow, 5 red and 6 purple balls. A sample of 6 balls is chosen. What is the probability that 3 yellow and at least 2 purple balls are chosen?

    (a) 0.5810

    (b) 0.2347

    (c) 0.1547

    (d) 0.1961

    (e) 0.1445

---

**Use this scenario for the next two questions.**

A hat has 5 red bunnies and 8 blue bunnies. A bunny is drawn one at a time without replacement until a blue bunny is drawn. Let $X$ be the number of bunnies drawn from the hat.

15. Classify the random variable and give the values of the random variable.

    (a) Finite discrete, $X = 1, 2, 3, 4, 5, 6$

    (b) Finite discrete, $X = 1, 2, 3, 4, 5$

    (c) Infinite discrete, $X = 1, 2, 3, \ldots$

    (d) Continuous, $0 < X \leq 6$

    (e) none of these

16. Compute $P(X = 2)$.

    (a) $\dfrac{8}{12}$

    (b) $\left(\dfrac{5}{13}\right)\left(\dfrac{8}{12}\right)$

    (c) $\dfrac{8}{13}$

    (d) $\dfrac{C(5,1)C(8,1)}{C(13,2)}$

    (e) none of these

17. What is the probability of getting between 1650 and 1670 twos (inclusive) in 10,000 throws of a six-sided die?

    (a) 0.0010

    (b) 0.2090

    (c) 0.2188

    (d) $9.3010 \times 10^{-5}$

    (e) none of these

---

**For the next two problems, use the following scenario.**

Two boxes originally contain the following marbles:

| Box A | Box B |
|---|---|
| 4 yellow | 2 yellow |
| 7 red | 2 red |
| | 2 green |

A marble is transferred from box A and placed in box B. Then a marble is selected from box B.

18. What is the probability that a yellow marble was transferred to box B if a yellow marble is selected from box B?

    (a) 0.3636

    (b) 0.5385

    (c) 0.1558

    (d) 0.2857

    (e) 0.4615

19. Which of these are independent events?

    I. Transferring a yellow marble and choosing a yellow marble from box B.

    II. Transferring a yellow marble and choosing a red marble from box B.

    III. Transferring a yellow marble and choosing a green marble from box B.

    IV. Transferring a red marble and choosing a yellow marble from box B.

    V. Transferring a red marble and choosing a green marble from box B.

    (a) only III gives independent events

    (b) only III and V give independent events

    (c) only I, II, IV give independent events

    (d) I, II, III, IV, and V give independent events

    (e) none of these give independent events

**Use the following dataset to answer the next two questions.**

| $X$ | 2 | 4 | 5 | 7 | 8 |
|---|---|---|---|---|---|
| frequency | 5 | 12 | 4 | 12 | 9 |

20. What is the mode of the data set?

    (a) 12

    (b) 4

    (c) 5

    (d) 4 and 7

    (e) none of these

21. What are the mean, median and standard deviation?

    (a) mean $= 6$; std. dev. $= 2.03$; median $= 5.57$

    (b) mean $= 6$; std. dev. $= 2.05$; median $= 5.57$

    (c) mean $= 5.57$; std. dev. $= 2.60$; median $= 6.5$

    (d) mean $= 5.57$; std. dev. $= 2.05$; median $= 6$

    (e) mean $= 5.57$; std. dev. $= 2.03$; median $= 6$

---

**For the next two problems, consider the following scenario:**

You pay \$2 to buy a lottery ticket with a 1/10 chance of a \$5 payoff, a 1/50 chance of a \$10 payoff a 1/500 chance of a \$100 payoff and a 1/20000 chance of a \$10,000 payoff. Let $X$ be your net winnings.

22. What is the expected value of $X$ (rounded to the nearest cent)?

    (a) \$2021.00

    (b) \$4.36

    (c) -\$0.15

    (d) -\$0.36

    (e) -\$0.60

23. What is the variance of $X$?

    (a) 5027.89

    (b) 5022.54

    (c) 3988.67

    (d) 70.87

    (e) 63.15

24. Let $X$ be the random variable for the number of hours a student works in a day. Classify the random variable and give values for the random variable.

    (a) Finite discrete $X = 1, 2, 3, \ldots, 16$

    (b) Finite discrete, $X = 0, 1, 2, \ldots, 24$

    (c) Finite discrete, $X = 1, 2, 3, \ldots, 24$

    (d) Continuous $0 \leq X \leq 24$

    (e) none of these

25. $E$ and $F$ are independent events. $P(E) = 0.8$. $P(F) = 0.85$. What are the odds in favor of $E \cap F$?

    (a) 17 to 8

    (b) 8 to 17

    (c) 8 to 25

    (d) 17 to 25

    (e) none of these