QUIZ 2: <u>60 Minutes</u>

Last Name: _____

First Name: _____

RIN: _____

Section: _____
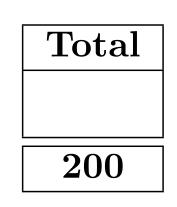
Answer **ALL** questions.
NO COLLABORATION or electronic devices. Any violations result in an F.
NO questions allowed during the test. Interpret and do the best you can.

GOOD LUCK!

Circle at most one answer per question.
10 points for each correct answer

You **MUST** show **CORRECT** work to get full credit.

When in doubt, TINKER.

Total

200

1. How many subsets of $\{a, b, c, d, e\}$ contain the letter a?

A 8.

B 16.

C 32.

D 64.

E None of the above.

2. How many subsets of $\{a, b, c, d, e\}$ have exactly 3 letters?

A 8.

B 16.

C 32.

D 64.

E None of the above.

3. There are 40 young women and 40 gray women. There are 50 women who are young or gray. How many women are both young and gray?

A 10.

B 20.

C 30.

D 40.

E None of the above.

4. You flip a 2-sided coin and roll a 6-sided die. How many outcomes are in the probability space?

A 6.

B 8.

C 10.

D 12.

E None of the above.

5. An experiment has 3 possible outcomes A, B, C. $P(A) = 1/3$, $P(B) = 1/6$. What is $P(C)$?

A 0

B 1/4.

C 1/2.

D 1.

E None of the above.

6. Make 3 flips of a biased coin, with probability of heads 2/3. What are the chances of more heads than tails?

A 1/2.

B 8/9.

C 16/27.

D 20/27.

E None of the above

7. In Problem 6, what are the chances of more heads than tails if all three flips match?

A 1/2.

B 8/9.

C 16/27.

D 20/27.

E None of the above

8. 1-in-20 men are color blind and 1-in-400 women are color blind. There are an equal number of men and women. What are the chances a random person is color blind?

A 1/20.

B 20/800.

C 21/800.

D 22/800.

E None of the above.

9. In Problem 8, what are the chances a random color blind person is a man?

A 1/20.

B 20/21.

C 20/800.

D 21/800.

E None of the above

10. 1-in-1000 drivers are drunk. A breathalyzer test is correct at saying if you are drunk or not 99.9% of the time. The breathalyzer says a random person is drunk. What are the chances they are drunk?

A 1/2.

B 99/100.

C 999/100.

D 999/1000.

E None of the above.

11. A box has 9 fair coins and 1 two-headed coin. Pick a random coin and flip. What are the chances of H?

A 9/20.

B 10/20.

C 11/20.

D 12/20.

E None of the above

12. In problem 11, your flip was H. What are the chances you picked a fair coin?

A 9/10.

B 9/11.

C 9/20.

D 11/20.

E None of the above

13. $\mathbf{X}$ is a uniform random variable taking a value in the set $\{1, 2, 3, 4\}$. What is $\mathbb{P}[\mathbf{X} = 2]$?

A 0.1.

B 0.2.

C 0.3.

D 0.4.

E None of the above.

14. In Problem 13, what is $\mathbb{P}[\mathbf{X} \geq 2]$?

A 0.

B 0.25.

C 0.5.

D 0.75.

E None of the above.

15. In Problem 13, what is $\mathbb{E}[\mathbf{X}]$?

A 2.

B 2.5.

C 3.

D 3.5.

E None of the above.

16. Roll a fair 6-sided die 4 times. What are the chances to roll exactly 2 fours?

A $140/6^4$.

B $150/6^4$.

C $160/6^4$.

D $170/6^4$.

E None of the above.

17. A biased coin has probability of heads 3/4. What is the expected number of heads in 20 flips?

A 5.

B 10.

C 15.

D 20.

E None of the above.

18. A box has 5 fair and 5 two-headed coins. Pick a random coin and make 10 flips. What is $\mathbb{E}[\text{number of heads}]$?

A 6

B 6.5

C 7

D 7.5

E None of the above.

19. Boys are twice as likely as girls. What is the expected number of kids till you have a boy?

A 1.

B 2.

C 3.

D 4.

E None of the above.

20. Ana and Amy have kids till a boy. For Ana, boys and girls are equally likely. For Amy, boys are twice as likely as girls. What is the expected number of kids Ana and Amy will have in total?

A 3.

B 3.5.

C 4.

D 4.5.

E None of the above.

SCRATCH