Solutions

1)	0.1579	13)	0.164
2)	0.3158	14)	0.063
3)	0.8421	15)	0.937
4)	0.6842	16)	0.773
5)	0.3158	17)	3.5
6)	0.3158	18)	0.032
7)	1.89	19)	0.137
8)	0.0012	20)	0.968
9)	0.9988	21)	0.572
10)	−9.40	22)	0.428
11)	0.008	23)	2.8
12)	0.055	24)	Solutions

East Los Angeles College
Department of Mathematics
Math 227
Test 3

1. **Drinking Coffee-** The following probability distribution represents the likelihood of drinking coffee the night before a final exam. Where x represents the number of cups of coffee a student drinks the night before a final exam and p(x) is the probability of drinking those number of cups of coffee the night before a final exam.

x	p(x)
0	0.1579
1	0.3158
2	0.2105
3	0.1579
4	0.1053
5	0.0526

x P(x)
0
0.3158
0.4210
0.4737
0.4212
0.263
1.8947

If you select a student at random, what's the probability the student:

1. Drank No coffee?

2. One cup of coffee?

3. At least one cup of coffee?

4. No more than two cups of coffee?

5. At least three cups of coffee?

6. More than two cups of coffee?

7. What's the expected number of cups of coffee a student will drink the night before a final? That is compute the expected value rounded to the nearest thousandths.

The Red Marble Game- Las Vegas has a game in which one pay's $ 10 for a chance to win $ 500. All you have to do is pick **three different** red marbles from a bag of marbles. The bag contains the following marbles.

10 Red
25 Purple
50 Pink

85

8. What's the probability of winning this game? **Approximate to the nearest ten thousandths.**

win

$$P(3 \text{ red}) = P(1^{st} R) \cdot P(2^{nd} R) \cdot P(3^{rd} R)$$

$$= \frac{10}{85} \cdot \frac{9}{84} \cdot \frac{8}{83} \approx 0.0012$$

9. What's the probability of losing this game? **Approximate to the nearest ten thousandths.**

$$P(\text{lose}) = 1 - P(\text{win})$$

$$= 1 - 0.0012 \approx 0.9988$$

10. Compute the expected value to the nearest hundredths.

x outcome		P(x) probability	x P(x)
490	win	$490 \cdot 0.0012$	0.588
-10	lose	$-10 \cdot 0.9988$	-9.988
			-9.40

$x = \#$ of boys ; $n = 7$; $p = 0.5$

Having Children- A couple plans to have 7 children. What's the probability the couple has:
Approximate to the nearest thousandths.

11. No boys?

$x = 0$

$P(x) = n C_x \, p^x (1-p)^{n-x}$

$P(0) = 7 C_0 \, 0.5^0 (0.5)^{7-0}$

$= 7C_0 \cdot 1 \cdot 0.5^7 = 0.5^7$

≈ 0.008

note: $1-p = 1-0.5 = 0.5$

12. One boy?

$x = 1$

$P(1) = 7 C_1 \, 0.5^1 (0.5)^{7-1}$

$= 7C_1 \cdot 0.5^1 \cdot 0.5^6$

$= 7 \cdot 0.5^6 \approx 0.055$

13. Two boys?

$x = 2$

$P(2) = 7 C_2 \, 0.5^2 (0.5)^{7-2}$

$= 7 C_2 \, 0.5^2 \cdot 0.5^5$

$= 7 C_2 \, 0.5^7 \approx 0.164$

14. No more than one boy?

$x \leq 1$

$P(x \leq 1) = P(0) + P(1)$

$= 0.008 + 0.055 \approx 0.063$

15. At least two boys?

$x \geq 2$

$P(x \geq 2) = P(2) + P(3) + P(4) + P(5)$

$= 1 - P(0) - P(1)$

$= 1 - 0.008 - 0.055 \approx 0.937$

16. More than two boys?

$x > 2$

$P(x > 2) = P(3) + P(4) + P(5)$

$= 1 - P(0) - P(1) - P(2)$

$= 1 - 0.008 - 0.055 - 0.164$

≈ 0.773

17. What's the expected number of boys?

$\mu = np$;

$\mu = 7 \cdot 0.5$; $\mu = 3.5$

Gun Control- CA State Legislature is considering gun control initiatives and has gathered the following data/information. They have determined that 35% of the population own a gun(s), while 65% do not own a gun(s). If you select 8 people at random, what's the probability:
Approximate to the nearest thousandths.

18. None will own a gun(s)? See Scratch

19. One person will own a gun(s)?

20. At least one person will own a gun(s)?

21. More than two people will own a gun(s)?

22. Less than three people will own a gun(s)?

23. What's the expected number of gun owners?

24. What's your name?

Math 227 Test 3

x = # of cups of coffee

(1) $x = 0$; $\boxed{P(0) = 0.1579}$

(2) $x = 1$; $\boxed{P(1) = 0.3158}$

(3) $x \geq 1$; $P(x \geq 1) = P(1) + P(2) + \dots + P(5)$

$= 1 - P(0)$

$= 1 - 0.1579$

$= \boxed{0.8421}$

(4) $x \leq 2$; $P(x \leq 2) = P(0) + P(1) + P(2)$

$= 0.1579 + 0.3158 + 0.2105$

$= \boxed{0.6842}$

(5) $x \geq 3$;

$P(x \geq 3) = P(3) + P(4) + P(5)$

$= 0.1579 + 0.1053 + 0.0526$

$= \boxed{0.3158}$

(6) $x > 2$; $P(x>2) = p(3) + p(4) + p(5)$

$= 0.1579 + 0.1053 + 0.0526$

$= \boxed{0.3158}$

(7) $\mu = \sum_{\text{all } x} x\, p(x)$ (See Test)

$\mu \approx 1.89$

(8) (15) let x = # who own guns

$n = 8$; $p = 0.35$ $1-p = 0.65$

0.35 → own guns (S) ; $1-p$ → 0.35

0.65 → Do not own gun(s)

$p(x) = {}_n C_x\, p^x (1-p)^{n-x}$

(15) $x = 0$; $p(0) = {}_8 C_0\, 0.35^0 (0.65)^{8-0}$

$p(0) = 0.65^8 \approx 0.032$

(19) $x=1$; $P(1) = {}^{8}C_1\, 0.35^1\, 0.65^{8-1}$

$P(1) = {}^{8}C_1\, 0.35^1\, 0.65^7$

≈ 0.137

(20) $x \geq 1$; $P(x \geq 1) = 1 - P(0)$

$= 1 - 0.032$

≈ 0.968

(21) $x > 2$; $P(x>2) = P(3) + P(4) + \dots + P(8)$

$P(x>2) = 1 - P(0) - P(1) - P(2)$

$0.032 \quad 0.137$

We need M.S value!

$P(2) = {}^{8}C_2\, 0.35^2\, 0.65^{8-2}$

$= {}^{28}C_2\, 0.35^2\, 0.65^6 \approx 0.259$

(22) ~~$x \leq 3$~~ $x < 3$

$P(x<3) = P(0) + P(1) + P(2)$

$= 0.032$

cont of (21)

$$P(x>2) = 1 - P(0) - P(1) - P(2)$$

$$= 1 - 0.032 - 0.137 - 0.259$$

$$\approx 0.572$$

(22) $x < 3$; $P(x<3) = P(0) + P(1) + P(2)$

$$= 0.032 + 0.137 + 0.259$$

$$\approx 0.428$$

(23) $\mu = np$; $\mu = 8 \cdot 0.35$; $\mu = 2.8$