Instructions: This quiz is an individual effort. Answer each question to the best of your ability. You are not permitted to use any resource besides your own knowledge to complete this quiz. The total points is 20. You may do work on a seperate piece of paper, but all answers must be written on the quiz and you must turn in your work. This means your work must be organized for the instructor to follow your thought process.

If you are unable to complete a question, whether it be due to time or not, write out what you would do or what you know relates to the question. This shows me you at least have knowledge on the subject matter and some knowledge on how to approach the problem, but are stuck on the execution.

1. For the below recursive sequences, find the explicit formula starting at n = 1.

a.
$$a_{n} = (n+1)a_{n-1}$$
, $a_{1} = 4$.

$$A_{n} = (n+1)n A_{n-2} = (n+1)n A_{n-3} = \dots = (n+1)(n) \cdot \dots \cdot (n-(n-3))A_{n-(n+1)}$$

$$= (n+1)n A_{n-2} = (n+1)n A_{n-3} = \dots = (n+1)(n) \cdot \dots \cdot (n-(n-3))A_{n-(n+1)}$$

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$$= (n+1)n A_{n-2} = (n+1)n A_{n-2} = \dots = (n+1)(n) \cdot \dots \cdot (n-(n-3)(n) \cdot \dots \cdot (n-(n-3))A_{n-2}$$

$$= (n+1)n A_{n-2} = (n+1)n A_{n-2} = \dots \cdot (n+1)(n) \cdot \dots \cdot (n-(n-3)(n) \cdot \dots \cdot$$

b. $a_n = 5a_{n-1} - 6a_{n-2}$, $a_1 = 6$, $a_2 = 6$.

$$x^{2} - 5x + 6 = 0 \qquad G_{1} = (3)^{2} u + 2^{2} v$$

$$(x-3)(x-2) = 0$$

$$x = 3, 2$$

$$6 = G_{2} = 9u + 4v \Rightarrow 6 = 9u + 4(3 - \frac{3}{2}u)$$

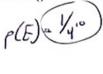
$$7v + 12 - 6u$$

-6=34 (2-2) = V-3-3/2(-2)=6

- A multiple choice test has 10 questions, each with 4 possible answers. Unlike all of you in this class, a student guesses on all 10 questions.
 - a. What is the probability the student gets all 10 right?

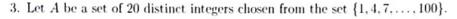
Total optors: 40°

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b. Find the probability they get at least 1 question right.

p(all mong) = 1/4 310/410
p(all mong) = 1/410
p(all mong) = 1/410



a. Prove there must be 2 distinct integers in A whose sum is 104.

PS: Lets look at all possible (ars who all be 104. (4,100), (7,97), (10,94), (13,91) (16,88), (17,85), (22,82), (25,79), (28,76), (31,73), (34,70), (37,67), (40,64) (43, 61), (46,58), (49,55), (52,52), this is 17 pars. 1.5 the only unused b. Above you've shown that there is a pair of integers in A whose sum is 104. Now determine a party

the minimum number of pairs that can be in A that add up to 104. 2! For where, 18 is the mex for my-pors. Thus, 2 poils will form from 20 chorses.

 John is a gambling computer science major, but he also knows that math can help him gamble smarter. Thus, John is learning probability for a new game he found online where he pays \$5 to play. The game goes as follows: The computer randomly generates a number 1 through 7. If you get a 6 or higher you win \$10. If you get a 4 or higher you at least get your money back. If you get below a 4 you lose. Being the computer science major he is, John made his own program based off some information he saw from the computer online and was able to determine the following:

(a)
$$P(7) = P(1)$$

(b)
$$P(6) = P(4) = P(2)$$

(c)
$$P(5) = P(3)$$
 (d) $2P(3) = 3P(1)$

(d)
$$2P(3) = 3P(1)^{-3}$$
 (1)
(e) $P(\text{more than } 4) = \frac{3}{3} \Rightarrow 2(5) + 2(6) + 2(7) = \frac{3}{6} \Rightarrow 2(7) + (2$

(d)
$$2P(3) = 3P(1)^{-2/3}$$
 (1)
(e) $P(\text{more than } 4) = \frac{3}{8} \Rightarrow P(S) + P(S) \Rightarrow P(S$

John knows you are an expert with probability and asks you to tell him the following:

a. The probability for each outcome. (Feel free to use another piece of paper and turn that

b. Let expected payout be the following: $E = \sum_{n=1}^{y} P(n) \cdot \text{(earnings)}$ where earnings is the earned amount minus the cost to play. Determine E for John and tell him whether he

should play or not.

(A)
$$(2) - (1) \Rightarrow p(6) = ||4| \Rightarrow p(2) \Rightarrow p(4)$$
.

(B) $\Rightarrow (1) \Rightarrow p(5) + ||4| + 2p(5) = 3/4 \Rightarrow 3p(5) = 4/8 \Rightarrow 4/0 = p(3)$
 $\Rightarrow (3) \Rightarrow (1) \Rightarrow p(5) + ||4| + 2p(5) = 3/4 \Rightarrow 3p(7) \Rightarrow 2/0 \Rightarrow 3p(7) \Rightarrow 2/0 \Rightarrow 3p(7) \Rightarrow 2/0 \Rightarrow 2$