

Reasons Logically

This task assesses your ability to **reason logically**. You will show your best work when you:

- *Read the task completely before starting.*
- *Show and clearly explain your thinking.*
- *Double-check your calculations and solution for reasonableness.*
- *Review the reflections section after completing the task.*

Take-a-Chance Allowance Plan! Your parents ask you to choose one of the following payment plans for your allowance.



Allowance Plan 1: You get \$27.50 per month.

Allowance Plan 2: Each month, you flip a coin. If it shows “heads,” you receive \$20. If it shows “tails,” you receive \$30.

Allowance Plan 3: Each month, you draw from a bag that contains a \$5 bill, a \$10 bill, a \$20 bill, and a \$50 bill. The bag is shaken and you draw two bills without looking.

Examine each plan carefully. For **each plan**, determine how much money you are likely to earn during the next 12 months. Explain your reasoning.

Reasons Logically: Take-a-Chance continued ...

Reflections

My response is good because I ...

- used probability to explain how much allowance I was likely to get for each plan during a twelve-month period;
- determined which allowance plan would give me the highest average allowance per month;
- justified my choice of an allowance plan.

2001 Math Power Scoring Guide: Take a Chance • Reasons Logically • Grade 6

	Criteria	4 Points <i>very fine work</i>	3 Points <i>fully acceptable work</i>	2 Points <i>partially acceptable</i>	1 Point <i>response attempted</i>	0 Points <i>none or insufficient</i>
Results	<ul style="list-style-type: none"> Does the solution identify the correct amounts earned in a 12-month period? 	<ul style="list-style-type: none"> Amount of money earned in a 12-month period is correct for each plan; AND 	<ul style="list-style-type: none"> Amount of money earned in a 12-month period may be incorrect for one plan due to a calculation error; AND 	<ul style="list-style-type: none"> Plans 1 and 2 may be incorrect due to a calculation error and solutions for plans 2 and 3 may show more than one amount (e.g., \$240 and \$360) and plan 3 may be incorrect; AND 	<ul style="list-style-type: none"> Solution may be missing for plan 1 but work supports a viable process and work for plan 2 shows attempt but solution may be incorrect or missing, and work for plan 3 may be incorrect or missing; AND 	<ul style="list-style-type: none"> Solutions may be incorrect for all three plans or no solutions given; OR
Interpret	<ul style="list-style-type: none"> Is probability used correctly to calculate the amount of allowance earned yearly for plans 2 and 3? 	<ul style="list-style-type: none"> Calculations show accurate use of probability to find solutions for plans 2 and 3; AND 	<ul style="list-style-type: none"> Calculations show accurate use of probability to find solutions for plans 2 and 3; AND 	<ul style="list-style-type: none"> For plan 2, calculations show understanding of probability as being 1/2; For plan 3, may not identify all combinations or identifies additional combinations and may not calculate total earnings or may use experimental probability; AND 	<ul style="list-style-type: none"> Work demonstrates understanding of the element of chance for plan 2 or 3 but lacks a viable method for figuring the mathematical probability; AND 	<ul style="list-style-type: none"> Shows no understanding of the element of chance (for example, may just multiply given numbers by 12); OR
Explain	<ul style="list-style-type: none"> Does an explanation support the process and solution? 	<ul style="list-style-type: none"> Clearly and thoroughly explains reasoning for processes used to find a solution for each plan. 	<ul style="list-style-type: none"> Explains reasoning for processes used to find a solution for each plan and may lack some thoroughness and clarity. 	<ul style="list-style-type: none"> Explanation of processes and/or equations used are flawed, minimal or not present beyond equations. 	<ul style="list-style-type: none"> Explanation of processes and/or equations used are minimal, not present, or have major flaws (for example, does not use the concept of probability to solve the problem). 	<ul style="list-style-type: none"> Explanation of processes and/or equations is irrelevant or only restates information contained within the prompt (for example, "shows heads, receive \$20") or no support given.

Numerical part of answer:

Plan 1: \$330 ($\27.50×12)

Plan 2: \$300 ($\$20 \times 6 + \30×6 OR $\$25 \times 12$); probability of getting either \$20 or \$30 is one-half

Plan 3: \$510 Possible combinations are: \$5 and \$10; \$5 and \$20; \$5 and \$50; \$10 and \$20; \$10 and \$50; \$20 and \$50. Each combination would likely come up twice within any given year, or total of all outcomes multiplied by 2.