

Got Luck?

The name of my game is: "Got Luck".

EQUIPMENT REQUIRED: You need a 6-sided die and a coin. [Both "fair" of course].

RULES - GAME PLAY. It costs nothing to start.

There are two prizes. PRIZE 1, if you roll a 5 or a 6 then flip a head you win \$5.00

PRIZE 2: If you roll 5 or 6 and get a tail you get \$2.00. If you don't win a prize then you pay \$2.00

EXPECTED VALUE CALCULATION

$$\begin{aligned}EV &= P(\text{PRIZE 1})(\text{PRIZE 1}) + P(\text{PRIZE 2})(\text{PRIZE 2}) - P(\text{NO PRIZE}) \cdot \text{LOSS} \\ &= \left(\frac{1}{3} \cdot \frac{1}{2}\right) \cdot 5 + \left(\frac{1}{3} \cdot \frac{1}{2}\right) (2) - \frac{4}{6} \cdot 2 \\ &= \frac{5}{6} + \frac{2}{6} - \frac{8}{6} = -\frac{1}{6} = -0.17 \text{ ea play on average.}\end{aligned}$$

So the player can expect to lose on average 17 cents each play.

So I actually played the game 30 times

⇒

EXEMPLAR PROBABILITY PROJECT

Play	Result	Play	Result	Play	Result
1	-2	11	-2	21	+5
2	+5	12	-2	22	-2
3	-2	13	-2	23	+5
4	-2	14	-2	24	+5
5	-2	15	-2	25	-2
6	-2	16	-2	26	-2
7	-2	17	-2	27	+2
8	+5	18	+2	28	+5
9	-2	19	-2	29	-2
10	-2	20	+5	30	-2

TOTALS. 21 Losses \cdot 2 = 42 LOST
 7 \times \$5 PRIZE = 35 WINNINGS
 2 \times \$2 PRIZE = 4 WINNINGS

NET = \$3 LOST OVERALL
 IN \$30 GAMES

* Notice I was luckier than expected should have only had 5 \times PRIZE 1 and 5 \times PRIZE 2

ONLY REALLY LOST 10¢ per game this round.

I won \$39 when should only have won \$35 on average in 30 games.

Enhanced game. To "sweeten" the game I might double the ^{next} prize if you win two in a row. But this is too hard to calculate(?) I may have to simulate it (experimental) probability.