Section 9-8 Mathematical Expectation

At a school carnival, students are awarded points for winning games. At the end of the evening, they may trade in points for prizes. You roll a single die. (game is 50 points to play)
Payoffs are:

Number	Probability	Points won(payoff)	Mathematical Expectation
1	1/6	-50	
2	1/6	10	
3	1/6	-50	
4	1/6	10	
5	1/6	-50	
6	1/6	100	

This is why some games are rigged at carnivals and casinos!

Mathematical Expectation

is found by multiplying the probability by the payoff and adding them.

$$E=\sum P(A_1)a_1 + P(A_2)a_2 + P(A_3)a_3 + P(A_4)a_4 \dots P(A_n)a_n$$

- For the mutually exclusive events $A_1, A_2, A_3, \dots, A_n$ in the experiment.
- The values $a_1, a_2, a_3, \dots, a_n$ correspond to the outcomes of $A_1, A_2, A_3, \dots, A_n$

It is the *weighted average* for a random experiment each time it is run.

Skeeball E

P(10) = 0.5
P(20) = 0.25
P(30) = 0.15
P(40) = 0.07
P(50) = 0.03