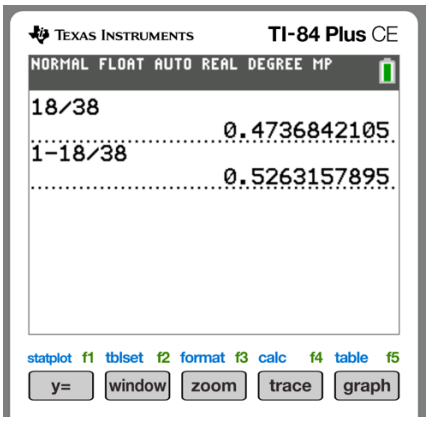
Expected Value Solutions

Roulette

A roulette wheel spins a ball on a wheel in which you have the following possible outcomes {0,00,1,2,3,4,…,36}

It costs $2 for a chance to win by **landing on red** for a winning prize of $20.
Approximate your answer to the nearest hundredths.



	x		p(x)	
	Amount	Outcome	Probability	xp(x)
	18	win	0.474	8.532
	-2	Lose	0.526	-1.052
Total				7.48

1. What's the cost of losing this game?

$$-2.00$$

2. What is the net amount for winning this game?

$$18.00$$

3. What is the probability of winning this game?

$$\frac{18}{38} \approx 0.474$$

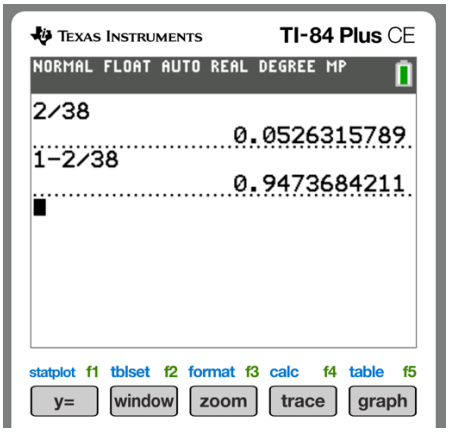
4. What is the probability of losing this game?

$$1 - \frac{18}{38} = 0.576$$

5. What is the expected value for this game?

$$\mu \approx 8.532 - 1.052 \approx 7.48$$

It costs $5 for a chance to win by **landing on green** for a winning prize of $75.
Approximate your answer to the nearest hundredths.



	x		p(x)	
	Amount	Outcome	Probability	xp(x)
	70	win	0.053	3.71
	-5	Lose	0.947	-4.735
Total				**-1.03**

6. What's the cost of losing this game?

$$-5.00$$

7. What is the net amount for winning this game?

$$70.00$$

8. What is the probability of winning this game?

$$\frac{2}{38} \approx 0.053$$

9. What is the probability of losing this game?

$$1 - \frac{2}{38} \approx 0.947$$

10. What is the expected value for this game?

$$\mu \approx 3.71 - 4.735 \approx -1.03$$

Life Insurance

A $25,000 Life Insurance policy for a 28-year-old female college student costs $ $800 for a chance to see 29 years of age. If the probability 28-year-old college students lives to see 29 years of age is 0.975, answer the following questions.

	x		p(x)	
	Amount	Outcome	Probability	xp(x)
	-800	Live	0.975	-780
	24,200	Not Live	0.025	605
Total				-175

11. How much do you receive for living?
Approximate your answer to the nearest hundredths.

$$-800.00$$

12. How much do you receive for not living?
Approximate your answer to the nearest hundredths.

$$24,200.00$$

13. What's the probability of living?
Approximate your answer to the nearest thousandths.

$$0.975$$

14. What's the probability for not living?
Approximate your answer to the nearest thousandths.

$$1 - 0.975 \approx 0.025$$

15. What's the expected value?
Approximate your answer to the nearest hundredths.

$$\mu \approx -780 - 605 \approx -175$$

A $35,000 Life Insurance policy for a 25-year-old male college student costs $ $650 for a chance to see 26 years of age. If the probability 25-year-old male college students lives to see 26 years of age is 0.982, answer the following questions.

	x		p(x)	
	Amount	Outcome	Probability	xp(x)
	-650	Live	0.982	-638.3
	34,350	Not Live	0.018	618.3
Total				-20

16. How much do you receive for living?
Approximate your answer to the nearest hundredths.

$$-650.00$$

17. How much do you receive for not living?
Approximate your answer to the nearest hundredths.

$$34350.00$$

18. What's the probability of living?
Approximate your answer to the nearest thousandths.

$$0.982$$

19. What's the probability for not living?
Approximate your answer to the nearest thousandths.

$$1 - 0.982 \approx 0.018$$

20. What's the expected value?
Approximate your answer to the nearest hundredths.

$$\mu \approx -638.30 - 618.30 \approx -20.00$$