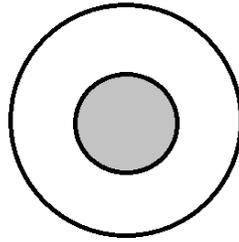


1. Convert the repeating decimal $0.257\overline{5} = 0.257555555\dots$ into a fraction of two integers.
2. We want to buy a car for \$8000. The dealership has a financing plan of no down payment and 9% APR for 24 months. Compute the monthly payment under this plan.
3. We want to buy a car for \$6500. The dealership has a financing plan of a down payment of \$500 and 36 monthly payments of \$189.40. What APR does the dealership charge?
4. a) We have 12 marbles in a container: 6 red, 4 green, and 2 blue. We randomly draw two marbles, with replacement. If the two marbles drawn are of the same color, we receive \$5. If the two marbles drawn are of different colors, we pay \$3. Compute the expected value of this game.
b) We play the same game, but this time, there is no replacement. Compute the expected value of this game.
5. We draw two numbers from $\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$, with replacement. If both numbers drawn are greater than 8, we receive \$20. Otherwise, we pay \$3. Find the expected value of this game.
6. We draw two numbers from $\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$, with no replacement. If both numbers drawn are greater than 8, we receive \$20. Otherwise, we pay \$3. Find the expected value of this game.
7. a) Compute the present value of four annual payments of \$2500, starting with the first payment today. Assume an annual compound interest rate of 4%, compounded continuously.
b) Compute the present value of four annual payments of \$2500, starting with the first payment a year from today. Assume an annual compound interest rate of 4%, compounded continuously.
8. This problem is easier if you use exact values such as $\sqrt{3}$ or 5π instead of decimals.
a) Compute the volume of a cone with base radius 4 m and height 6 m. Include units in your computation and answer.
b) Suppose we "double" this cone: take a cone with base radius 8 m and height 12 m. What is the volume of this cone? Compute the ratio of volume of the larger cone to the volume of the smaller cone.
c) Suppose we "triple" the cone from part a): take a cone with base radius 12 m and height 18 m. What is the volume of this cone? Compute the ratio of volume of the larger cone to the volume of the smaller cone.
9. We roll two dice. If the two numbers rolled are the same, we receive \$10. Otherwise, we pay \$2. Compute the expected value of this game.
10. We roll three dice. If the three numbers rolled are the same, we receive \$100. Otherwise, we pay \$1. Compute the expected value of this game.
11. We play the following game. To enter the game, we have to pay \$3. Once the fee is paid, we roll two dice. If the product of the two numbers rolled is odd, we receive \$10. Otherwise, nothing happens. Compute the expected value of this game.

12. Consider the object shown on the picture below. The larger circle is of radius 5 feet, the smaller circle is of radius 2 feet. We drop very small objects at the figure.



- a) What is the probability that an object lands in the shaded area?
- b) What is the probability that an object lands outside of the shaded area?
- c) We play the following game. If the object lands in the shaded area, we get \$5. Otherwise, we pay \$1. Compute the expected value of this game.
13. a) We roll two dice. If the two numbers rolled are the same, we get as much as the sum of the two numbers rolled. (For example, a roll of 3 and 3 means that we receive \$6.) Otherwise, we pay \$3. Compute the exact value of this game.
- b) We roll two dice. If the two numbers rolled are the same, we get as much as the product of the two numbers rolled. (For example, a roll of 3 and 3 means that we receive \$9.) Otherwise, we pay \$3. Compute the exact value of this game.
14. We roll two dice. If the sum of the two numbers rolled is greater than 10, we get x . Otherwise, we pay \$2.
- a) Compute the value of x if we know that this game has an expected value of zero. (Set up an equation and solve it.)
- b) Compute the value of x if we know that this game has an expected value of $-\$1$. (Set up an equation and solve it.)