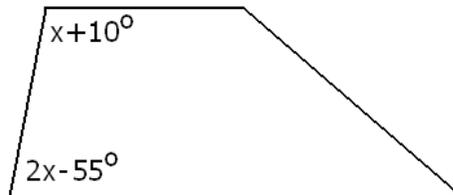


- Convert the following decimals into fractions of integers. You do NOT need to bring these fractions to lowest terms.  
a) 2.006      b)  $2.\overline{17}$        $1.\overline{205}$
- In a class with 40 students let  $M$  be the number of students who take math and  $P$  the set of students who take physics. If  $|\overline{M} \cap \overline{P}| = 13$ ,  $|M| = 15$  and  $|P| = 20$ , find the number of students who take both math and physics.
- Find  $x$  based on the picture below. The polygon shown is a trapezoid.



- The complement of an angle is  $14^\circ$  less than three times the angle. Find this angle.
- Find the volume of a cylinder that has height 15 in and base radius of 5 in.
  - Find the volume of a cone that has height 15 in and base radius of 5 in.
- The price of a book was increased by 125%. The current price is \$135. Find the original price.
- Find the coefficient of  $x^3y^7$  in the expanded form of  $(x+y)^{10}$ .
- We roll two a die twice.
  - What is the probability that the sum of the two numbers rolled is 7, given that the sum of the two numbers rolled is larger than 4?
  - What is the probability that the second number rolled is larger than the first one, given that the first number rolled is 4?
- We have 10 marbles in a bag: 7 red and 3 blue. We randomly pull two marbles, with replacement. If both marbles pulled are red, we pay \$5. If both marbles pulled are blue, we receive \$20. If the marbles have different colors, we roll again. Find the expected value for this game.
- We have 10 marbles in a bag: 7 red and 3 blue. We randomly pull two marbles, without replacement. If both marbles pulled are red, we pay \$5. If both marbles pulled are blue, we receive \$20. If the marbles have different colors, we roll again. Find the expected value for this game.
- We have 10 marbles in a bag: 7 red, 2 blue, and 1 yellow. We randomly pull two marbles, without replacement. If we pull no blue marbles, nobody pays. If we pull one blue marble, we receive \$1. If we pull two blue marbles, we receive \$2. Find the expected value for this game.
- We pull two cards from  $\{1, 2, \dots, 10\}$ , with replacement.
  - If the product of the two number pulled is even, we pay \$3. If it is odd, we receive \$10. Find the expected value of this game.
  - If the sum of the two number pulled is even, we pay \$3. If it is odd, we receive \$10. Find the expected value of this game.
- We pull two cards from  $\{1, 2, \dots, 10\}$ , without replacement.
  - If the product of the two number pulled is even, we pay \$3. If it is odd, we receive \$10. Find the expected value of this game.
  - If the sum of the two number pulled is even, we pay \$3. If it is odd, we receive \$10. Find the expected value of this game.

14. We toss three coins. What is the probability that the number of heads is two or three?
15. We roll two dice. If the difference between the numbers rolled is less than 3, we pay \$2. Otherwise we receive \$5. Find the expected value of this game.
16. We have 10 marbles in a bag: 7 red, 2 blue, and 1 yellow. We randomly pull two marbles, without replacement. Find the expected value of the number of red marbles pulled.
17. We randomly pull a card from a standard deck of 52. If the card is the ace of spade, we receive \$20. If it is an ace but not spade, we receive \$10. If it is spade but not the ace, we receive \$5. In every other case, we pay \$3. Find the expected value for this game.
18. We have 10 marbles in a bag: all blue or red. We randomly pull a marble. If it is red, we pay \$2. If it is blue, we receive \$5. How many red marbles are there in the bag if the expected value of this game is \$0.80?
19. A healthy 40 year old male wishes to buy a health insurance policy for a year. The insurance would pay \$100000 in case of death. The insurance company charges \$1000 for this policy. Statistical data tells us that a healthy 40 year old male has a 0.3 percent chance to die this year. Find the expected value of this policy
  - a) for the customer
  - b) for the insurance company.
20. Three cards are drawn from a deck of 52 cards.
  - a) What is the probability that we draw three clubs?
  - b) What is the probability that we draw three clubs, given that no hearts was drawn?
21. Team A and B are finalists for the champion title. At any game, team A has a 65% chance to win. The teams play 5 games. Find the probability of
  - a) team A wins all five games
  - b) team A wins four games
  - c) team A wins three games
  - d) team A wins two games
  - e) team A wins one game
  - f) team A loses all five games
22. Teams A and B are the finalists in a championship. In every game, the probability of Team A winning is 60%, and the probability of Team B winning is 40%. The two teams will play games until one team wins two games. Find the probability of Team A winning the championship.
23. A 5 feet tall person is standing 20 feet away from a streetlight that is 30 feet tall. How long is her shadow?

## Answers

1.) a)  $\frac{2006}{1000}$    b)  $\frac{215}{99}$    c)  $\frac{1204}{999} = 1\frac{205}{999}$    2.) 8   3.)  $75^\circ$    4.)  $26^\circ$

5.) a)  $375\pi \text{ in}^3 \approx 1178.10 \text{ in}^3$    b)  $125\pi \text{ in}^3 \approx 392.699 \text{ in}^3$    6.) \$60   7.) 120   8.) a)  $\frac{1}{5}$    b)  $\frac{1}{3}$

9.)  $-\frac{13}{20} = -0.65$    10.) -1   11.)  $\frac{2}{5}$    12.) a) \$0.25   b) \$3.5   13.) a)  $-\$ \frac{1}{9}$    b)  $\$ \frac{38}{9}$

14.)  $\frac{1}{2}$    15.)  $\$ \frac{1}{3}$    16.)  $\frac{7}{5}$    17.)  $\$ \frac{1}{26}$    18.) 6   19.) a)  $-\$700$    b) \$700   20.) a)  $\frac{11}{850}$    b)  $\frac{22}{703}$

21.) a) 0.116 03   b) 0.312 386   c) 0.336 42   d) 0.181 146 9   e) 0.048770   f) 0.005252 19

22.) 0.648   23.) 4 feet