Section: A9

Roll no. : LF2BSCS0379

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Question 1: (10 marks) Use Polya’s four-step problem-solving strategy. A frog is at the bottom of a 17-foot well. Each time the frog leaps it moves up the side of the wall a distance of 3 feet. If the frog has not reached the top of the well, then the frog slides back 1 foot before it is ready to make another leap. How many leaps will the frog need to reach the top of the well?

**Answer:**

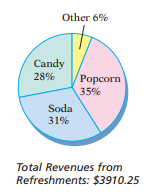
Distance with leap back = 3 + (-1) = 2 feet , After 2 jumps = 2 + 2 = 4 feet, After 3 jumps = 6 feet, After 4 jumps = 8 feet. After 5 jumps = 10 feet, After 6 jumps = 12 feet, After 7 jumps = 14 feet , After 8th jump the frog will not leap back; because it has reached the top of the well.

Distance = Distance after 7 jumps + 3= 14 + 3

TOTAL= 17 feet.

It means frog need **8** leaps to reach the top.

Question 2: (10 marks) The following circle graph shows the percentages of refreshment revenues that a movie theatre complex received from various types of refreshments on a given day.



1. Determine the revenue the theatre earned from candy sales for the given day. b. By how much did the popcorn revenue exceed the soda revenue for the given day?

**Answer**:

In the given graph, candy sale is 28% of the total revenue.

a) The revenue of candy = 3910.25 × 28/100 = $1094.87

b) The revenue of popcorn = 3910.25 × 35/100 = $1368.58

c) The revenue of soda = 3910.25 × 31/100 = $1212.17

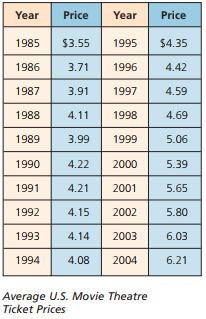
d) The exceeded revenue of popcorn to soda = 1368.58 - 1212.17 = $156.41

The exceeded revenue of popcorn to soda = $156.41.

**Question 3:**

The set of years in which the monthly principal and interest payments for average-priced existing homes  
were between $700 and $800

The following table shows the average U.S. movie theatre ticket prices for the years from 1985 to 2004.



Use the information in the above table and the roster method to represent the sets and their cardinality in Part (a) and (b).  
**(a)** The set of years in which the average ticket prices were less than $4.00  
**(b)** The set of years in which the average ticket prices were greater than $4.25 but less than $6.00

**Answer:**

The set of years in which the average ticket prices were less than $4.00 = {1985, 1986, 1987, 1989}.

The set of years in which the average ticket prices were greater than $4.25 but less than $6.00 = {1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002}.

**Question 4:**

Let U={1,2,3,4,5,6,7,8}, A={2,4,6} and B={1,2,5,8} and C={1,3,7}  
Find each of the following

1. A ∩ B’
2. A ∩ (B U C)
3. A’ U (B ∩ C)
4. (A U C’) ∩ (B U A’)
5. (B ∩ A’) U (B’ U C)

**Answer:**

1. **A ∩ B’**

**Answer:**

B’ = U – B

= {1, 2, 3, 4, 5, 6, 7, 8} – {1, 2, 5, 8}

B’ = {3, 4, 6, 7}

A ∩ B’ = {2, 4, 6} ∩ {3, 4, 6, 7}

= {4, 6}

1. **(b) A ∩ (B U C)**

**Answer:**

B U C = {1, 2, 5, 8} U {1, 3, 7}

= {1, 2, 3, 5, 7, 8}

A ∩ (B U C) = {2, 4, 6} ∩ {1, 2, 3, 5, 7, 8}

= {2}

1. **(c) A’ U (B ∩ C)**

**Answer:**

A’ = U – A = {1, 2, 3, 4, 5, 6, 7, 8} – {2, 4, 6}

= {1, 3, 5, 7, 8}

B ∩ C = {1, 2, 5, 8} ∩ {1, 3, 7}

= {1}

A’ U (B ∩ C) = {1, 3, 5, 7, 8} U {1}

= {1, 3, 5, 7, 8}

1. **(A U C’) ∩ (B U A’)**

**Answer:**

C’ = U – C

= {1, 2, 3, 4, 5, 6, 7, 8} - {1, 3, 7}

= {2, 4, 5, 6, 8}

A U C’ = {2, 4, 6} U {2, 4, 5, 6, 8}

= {2, 4, 5, 6, 8}

A’ = U – A

= {1, 2, 3, 4, 5, 6, 7, 8} – {2, 4, 6}

= {1, 3, 5, 7, 8}

B U A’ = {1, 2, 5, 8} U {1, 3, 5, 7, 8}

= {1, 2, 3, 5, 7, 8}

(A U C’) ∩ (B U A’) = {2, 4, 5, 6, 8} ∩ {1, 2, 3, 5, 7, 8}

= {2, 5, 8}

**(e) (B ∩ A’) U (B’ U C)**

**Answer:**

A’ = U – A

= {1, 2, 3, 4, 5, 6, 7, 8} – {2, 4, 6}

= {1, 3, 5, 7, 8}

B ∩ A’ = {1, 2, 5, 8} ∩ {1, 3, 5, 7, 8}

= {1, 5, 8}

B’ = U – B = {1, 2, 3, 4, 5, 6, 7, 8} – {1, 2, 5, 8} ={3, 4,6, 7}

B’ U C = {3, 4, 6, 7} U {1, 3, 7}

= {1, 3, 4, 5, 6, 7}

(B ∩ A’) U (B’ U C) = {1, 5, 8} U {1, 2, 3, 5, 7, 8}

= {1, 2, 3, 5, 7, 8}