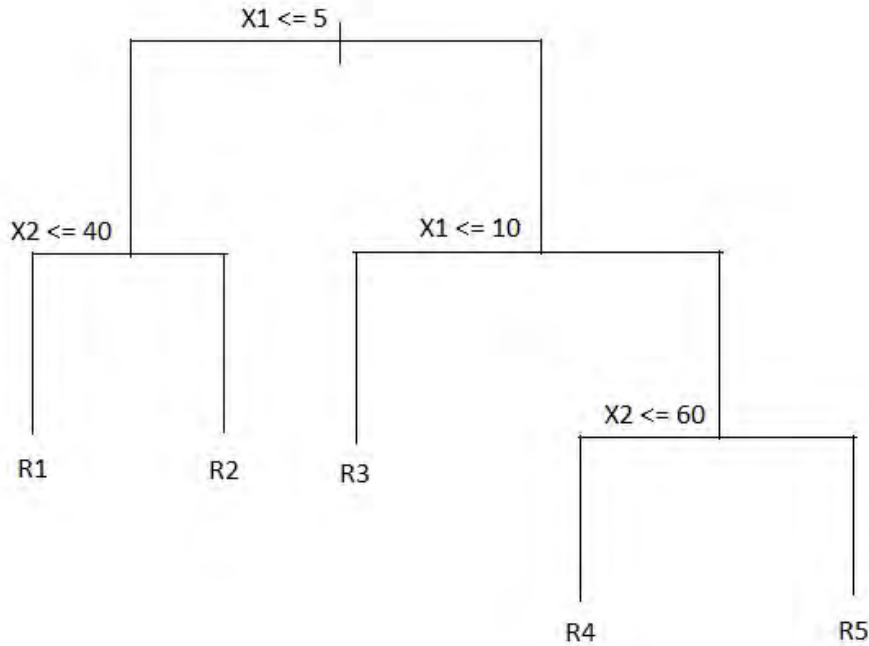


66. You are given the following regression tree (where the inequality represents the values in the left hand branch of a split).

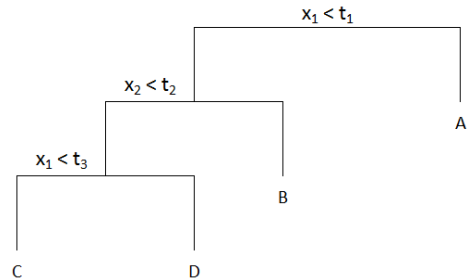


Determine the set of regions that represents this regression tree.

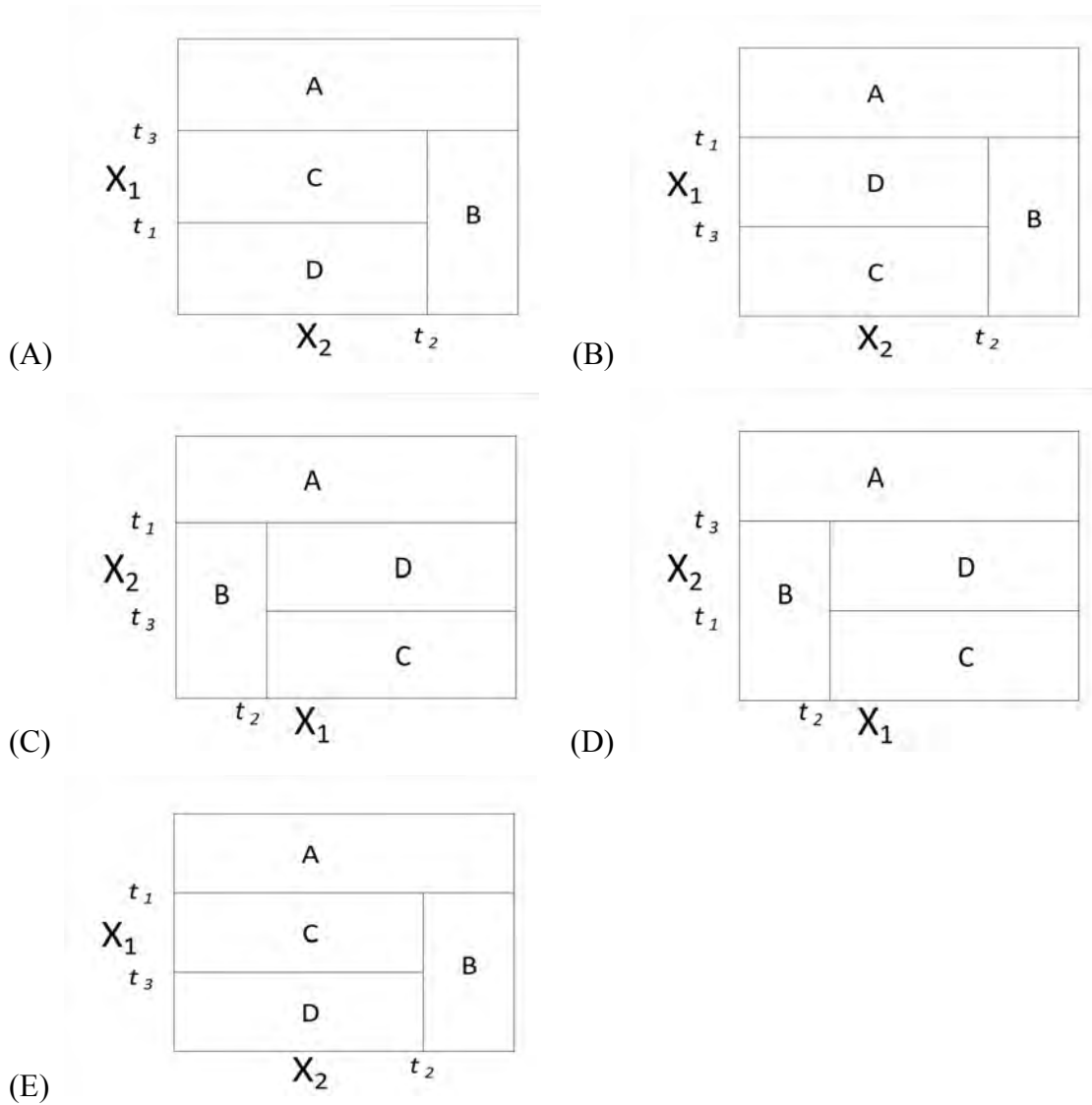
- (A) Region 1:  $\{X \mid X_1 \leq 5, X_2 \leq 40\}$   
 Region 2:  $\{X \mid X_1 \leq 5, X_2 > 40\}$   
 Region 3:  $\{X \mid X_1 > 5\}$   
 Region 4:  $\{X \mid X_1 > 10, X_2 \leq 60\}$   
 Region 5:  $\{X \mid X_1 > 10, X_2 > 60\}$
- (B) Region 1:  $\{X \mid X_1 \leq 5, X_2 \leq 40\}$   
 Region 2:  $\{X \mid X_1 \leq 5, X_2 > 40\}$   
 Region 3:  $\{X \mid X_1 > 5, X_2 \leq 60\}$   
 Region 4:  $\{X \mid X_1 > 10, X_2 \leq 60\}$   
 Region 5:  $\{X \mid X_1 > 10, X_2 > 60\}$
- (C) Region 1:  $\{X \mid X_1 \leq 5, X_2 > 40\}$   
 Region 2:  $\{X \mid X_1 \leq 5, X_2 \leq 40\}$   
 Region 3:  $\{X \mid 5 < X_1 \leq 10\}$   
 Region 4:  $\{X \mid X_1 > 10, X_2 \leq 60\}$   
 Region 5:  $\{X \mid X_1 > 10, X_2 > 60\}$

47. DELETED

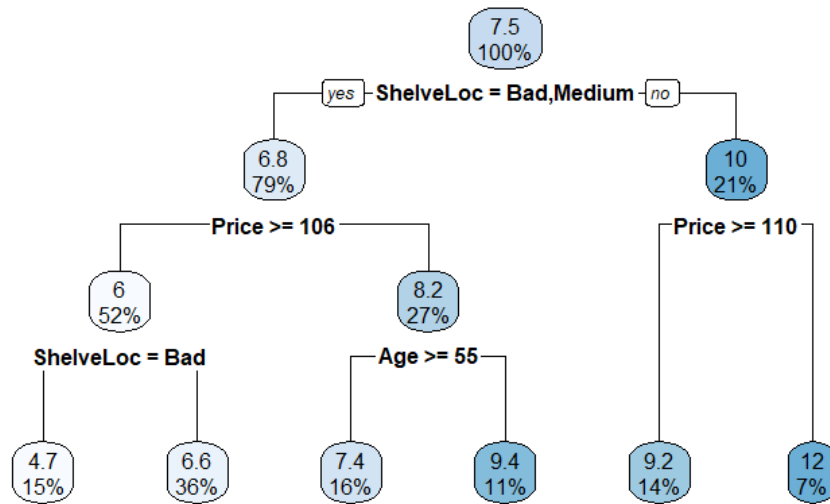
48. The following tree was constructed using recursive binary splitting with the left branch indicating that the inequality is true.



Determine which of the following plots represents this tree.



63. You have constructed the following regression tree predicting unit sales (in thousands) of car seats. The variable ShelfLoc has possible values Good, Medium, and Bad.

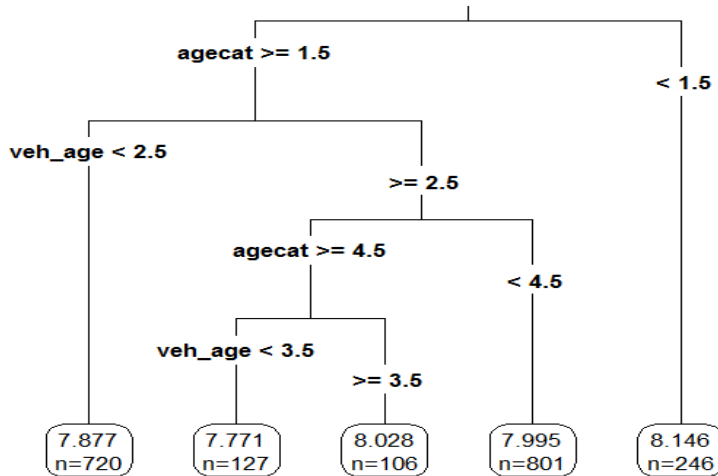


Variable	Observed Value
ShelveLoc	Good
Price	120
Age	57
Advertising	12

Determine the predicted unit sales (in thousands) for the above observation based on the regression tree.

- (A) 4.7
- (B) 6.6
- (C) 7.4
- (D) 9.2
- (E) 9.4

33. The regression tree shown below was produced from a dataset of auto claim payments. Age Category (agecat: 1, 2, 3, 4, 5, 6) and Vehicle Age (veh\_age: 1, 2, 3, 4, ...) are both predictor variables, and log of claim amount (LCA) is the dependent variable.



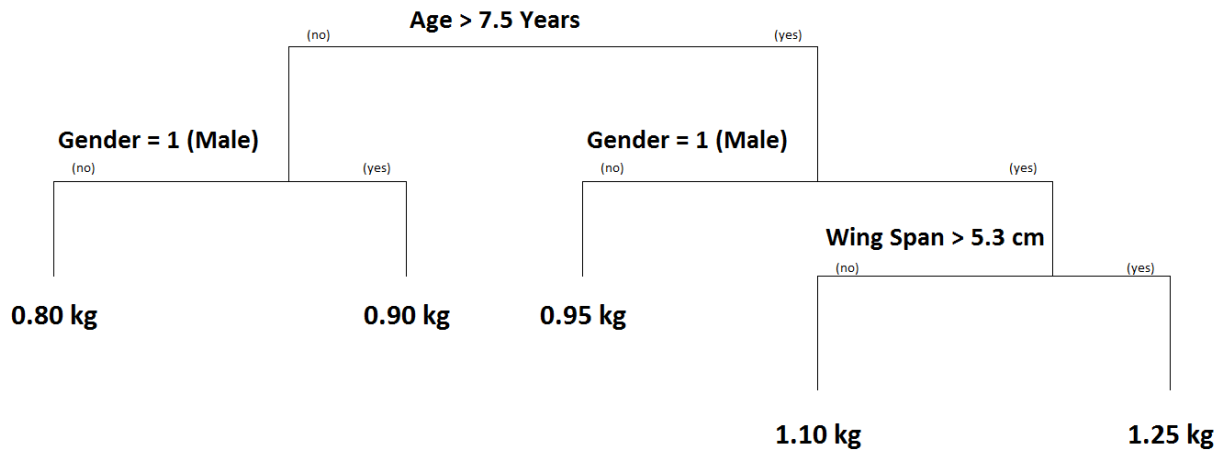
Consider three autos I, II, III:

- I: An Auto in Age Category 1 and Vehicle Age 4
- II: An Auto in Age Category 5 and Vehicle Age 5
- III: An Auto in Age Category 5 and Vehicle Age 3

Rank the estimated LCA of Autos I, II, and III.

- (A)  $LCA(I) < LCA(II) < LCA(III)$
- (B)  $LCA(I) < LCA(III) < LCA(II)$
- (C)  $LCA(II) < LCA(I) < LCA(III)$
- (D)  $LCA(II) < LCA(III) < LCA(I)$
- (E)  $LCA(III) < LCA(II) < LCA(I)$

51. You are given the following regression tree predicting the weight of ducks in kilograms (kg):



You predict the weight of the following three ducks:

X: Wing Span = 5.5 cm, Male, Age = 7 years

Y: Wing Span = 5.8 cm, Female, Age = 5 years

Z: Wing Span = 5.7 cm, Male, Age = 8 years

Determine the order of the predicted weights of the three ducks.

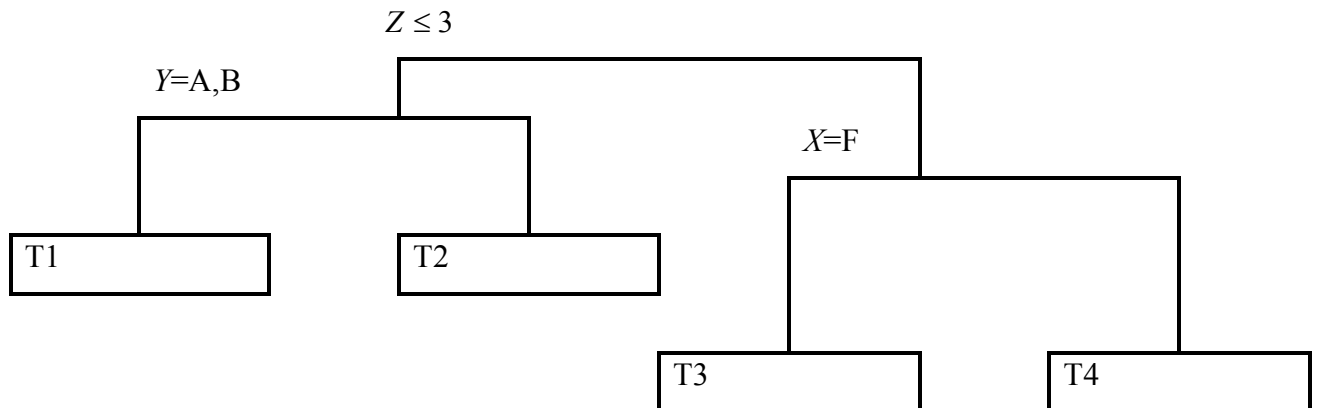
- (A)  $X < Y < Z$
- (B)  $X < Z < Y$
- (C)  $Y < X < Z$
- (D)  $Y < Z < X$
- (E)  $Z < X < Y$

57. You are given:

- i) The following observed values of the response variable,  $R$ , and predictor variables  $X$ ,  $Y$ ,  $Z$ :

$R$	4.75	4.67	4.67	4.56	4.53	3.91	3.90	3.90	3.89
$X$	M	F	M	F	M	F	F	M	M
$Y$	A	A	D	D	B	C	B	D	B
$Z$	2	4	1	3	2	2	5	5	1

- ii) The following plot of the corresponding regression tree:



Calculate the Mean Response (MR) for each of the end nodes.

- (A)  $MR(T1) = 4.39$ ,  $MR(T2) = 4.38$ ,  $MR(T3) = 4.29$ ,  $MR(T4) = 3.90$   
 (B)  $MR(T1) = 4.26$ ,  $MR(T2) = 4.38$ ,  $MR(T3) = 4.62$ ,  $MR(T4) = 3.90$   
 (C)  $MR(T1) = 4.26$ ,  $MR(T2) = 4.39$ ,  $MR(T3) = 3.90$ ,  $MR(T4) = 4.29$   
 (D)  $MR(T1) = 4.64$ ,  $MR(T2) = 4.29$ ,  $MR(T3) = 4.38$ ,  $MR(T4) = 3.90$   
 (E)  $MR(T1) = 4.64$ ,  $MR(T2) = 4.38$ ,  $MR(T3) = 4.39$ ,  $MR(T4) = 3.90$