1. Formulate the equivalent problem of the following, for interior penalty function method

$$Minimize\ f(x) = 0.5x\ subject\ to\ x - 4 \geq 0.$$

   a. $Minimize\ \varphi(x) = 0.5x - \min(0, \frac{r}{x-4})$
   b. $Minimize\ \varphi(x) = 0.5x + Max(0, \frac{r}{x-4})$
   c. $Minimize\ \varphi(x) = 0.5x * \frac{r}{x-4}$
   d. $Minimize\ \varphi(x) = 0.5x + \frac{r}{x-4}$

2. Penalty parameter *r* of the equivalent problem of the following in interior penalty function method

$$Minimize\ f(x) = 0.5x\ subject\ to\ x - 4 \geq 0.$$

   a. $r > 0$ and $r \to 0$ at feasible point
   b. $r < 0$ and $r \to 0$ at feasible point
   c. $r > 0$ and $r \to \propto$ at feasible point
   d. $r < 0$ and $r \to \propto$ at feasible point

3. Multi-objective decision making has

   a. Unique optimal solution
   b. Infinite number of optimal solutions
   c. Unique Pareto-optimal solution
   d. Infinite number of Pareto-optimal solutions

4. Multi-attribute decision making has

   a. Unique optimal solution
   b. Infinite number of optimal solutions
   c. Unique Pareto-optimal solution
   d. Finite number of pareto-optimal solutions

5. Find the best Pareto-solution of the following situation

Flight	Travel time	Ticket price
A	15	₹15700
B	14	₹ 17000
C	13	₹ 16000
D	12.5	₹ 18500
E	11	₹ 18200

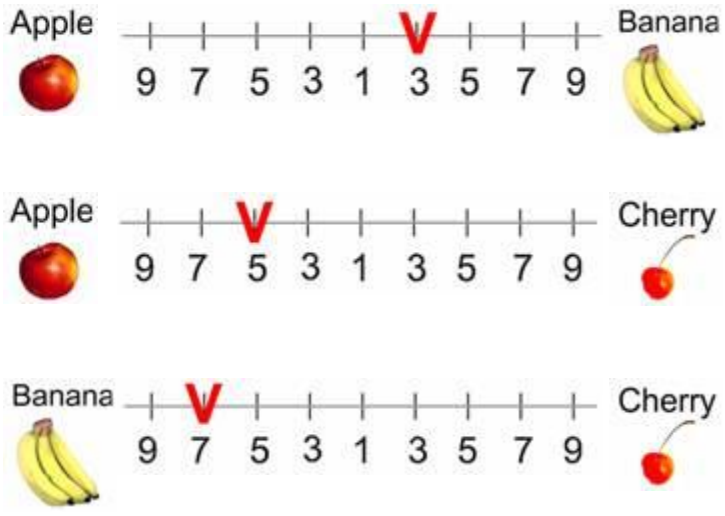
a. B and D

b. A and C

c. D and A

d. A and E

6. Obtain the priority matrix of the following situation



a. $A = \begin{array}{c} \\ apple \\ banana \\ cherry \end{array} \begin{array}{c} \begin{array}{ccc} apple & banana & cherry \end{array} \\ \begin{bmatrix} 1 & \frac{1}{3} & 5 \\ 3 & 1 & 7 \\ \frac{1}{5} & \frac{1}{7} & 1 \end{bmatrix} \end{array}$

b. $A = \begin{array}{c} \\ apple \\ banana \\ cherry \end{array} \begin{array}{c} \begin{array}{ccc} apple & banana & cherry \end{array} \\ \begin{bmatrix} 1 & \frac{1}{3} & 5 \\ \frac{1}{5} & 1 & 7 \\ \frac{1}{7} & \frac{1}{7} & 1 \end{bmatrix} \end{array}$

c. $A = \begin{array}{c} \\ apple \\ banana \\ cherry \end{array} \begin{array}{c} \begin{array}{ccc} apple & banana & cherry \end{array} \\ \begin{bmatrix} 1 & \frac{1}{3} & 5 \\ \frac{1}{7} & 1 & 7 \\ \frac{1}{5} & \frac{1}{7} & 1 \end{bmatrix} \end{array}$

d. $A = \begin{array}{c} \\ apple \\ banana \\ cherry \end{array} \begin{array}{c} \begin{array}{ccc} apple & banana & cherry \end{array} \\ \begin{bmatrix} 1 & \frac{1}{3} & 5 \\ 7 & 1 & 7 \\ \frac{1}{5} & 5 & 1 \end{bmatrix} \end{array}$

7. In Analytical Hierarchy Process, obtain the priority vector of the following

$$\begin{array}{c} \\ A \\ B \\ C \end{array} \begin{array}{c} \begin{array}{ccc} A & B & C \end{array} \\ \begin{bmatrix} 1 & \frac{1}{3} & 5 \\ 3 & 1 & 7 \\ \frac{1}{5} & \frac{1}{7} & 1 \end{bmatrix} \end{array}$$

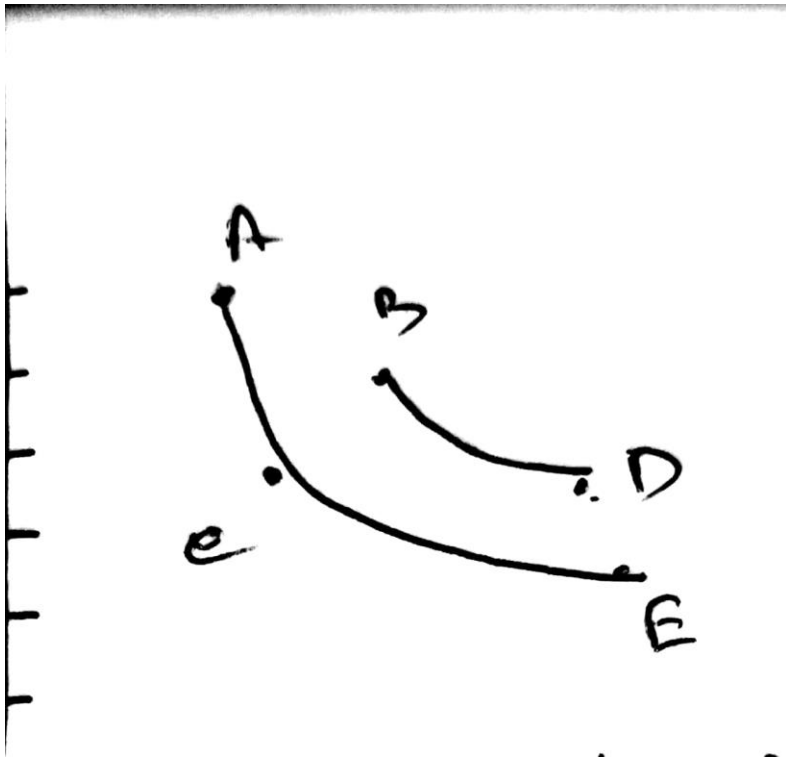
a. $[.2828, .6434, .0738]^T$

b. $[.2828, .1434, .0738]^T$

c. $[28.28, 64.34, 7.38]^T$

d. $[.343, .987, .123]^T$

Week 11 questions are straightforward

1. Self-explanatory
2. Self-explanatory
3. Self-explanatory
4. Self-explanatory
5. 

6. Self-explanatory

7)

	A	B	C
A	1	$\frac{1}{3}$	5
B	3	1	7
C	$\frac{1}{5}$	$\frac{1}{7}$	1

Summing up the rows

9.2	1.476	13

dividing each column by the sums the new matrix

$$\begin{bmatrix} 0.23809 & 0.2258 & 0.3846 \\ 0.71428 & 0.6775 & 0.5384 \\ 0.0476 & 0.0967 & 0.0769 \end{bmatrix} \begin{matrix} = 0.28293 \\ = 0.6434 \\ = 0.0738 \end{matrix}$$

Now row average

So the answer is $[0.2828, 0.6434, 0.0738]^T$