2009

ISI-Entrance Solutions

Economics

This document contains solutions of 2009 sample exam problems (ME-I, ME-II) for admission to MSQE program of the Indian Statistical Institute.
Disclaimer: The solutions offered in the document can be incorrect, the likelihood of which is very small though, so use at your own risk.

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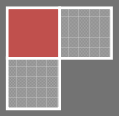

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ISI: Year 2009

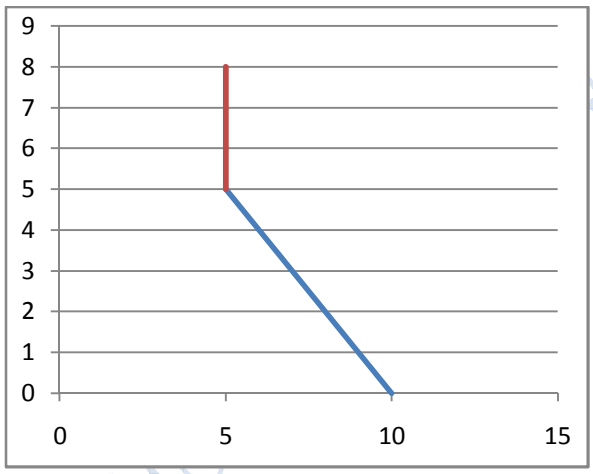
ME-I

1. (b) ¾
2. (d) $(½)^{1/3}$
3. (b) $(f^2(x)-f(x))/(2f(x)-1)$
4. (a) 1/6
5. (d) Y=X-1
6. (c) log((1+e)/2)
7. (c) 2/9
8. (c) -1
9. (c) is continuous but not differentiable
10. (c) 21
11. (b) 32
12. (b) 7/16
13. (c) ≥3
14. (b) 1/3
15. (d) 5
16. (b) $n > \mu$
17. (b) f(z) = az for some real number a
18. (a) 0
19. (c) $\begin{vmatrix} f'(x) & g'(x) & h'(x) \\ l & m & n \\ a & b & c \end{vmatrix}$
20. (a) 0
21. (c) c
22. (a) $(m+1)^n-1$
23. (b) A=3/4, B=-1/4
24. (d) 9
25. (b) 2/3
26. (a) (1, 0)

27. (b) 1
28. (b) 9
29. (a) it decreases on the interval $[2-3^{-1/2}, 2+3^{-1/2}]$
30. (d) 18

ME-II (Only selected problems)

1. (i) less than 1
   (ii) $Y^*=(c_0-tc_0+I+G)/(1-c_1(1-t_1))$
   (iii) multiplier$=1/(1-c_1(1-t_1))$
2. (i) $c_0=w/(1+\delta)$; $c_1=(w(1+r)\delta)/(1+\delta)$;
   (ii) As r increases c_0 stays the same and c_1 increases.
   (iii) $(1+r)\delta=1$
3. (i)



   (ii) Show that: $\min(2\alpha x_1, \alpha x_1+\alpha x_2) = \alpha\min(2x_1, x_1+x_2)$ for $\alpha>0$ (Its easy)
   (iii) C = Q
4. (i) Entire Edgeworth Box
   (ii) 45° line from top left to bottom right in an edgeworth box with price ratio equal to 1.
   (iii) Yes, perfectly competitive outcomes are pareto optimal. No, it does not hold generally in all economies.
5. (i) $p = (20 + a)/4$; $q_1 = (20 - a)/4$; $q_2 = (3a - 20)/4$
   (ii) $p_1 = 7.5$; $q_1 = 2.5$; $p_2 = (a + 5)/2$; $q_2 = (a - 5)/2$
   (iii) Just compare the profits

(iv) $CS(i) = \frac{1}{2}\{((20 - a)/4)^2 + ((3a - 20)/4)^2\}$

$CS(ii) = \frac{1}{2}\{6.25 + ((a - 5)/2)^2\}$

6. (i) $q_1 = (120 - q_2 - q_3)/2$

(ii) $q_1 = q_2 = q_3 = 30$

(iii) Case: Firm 2 and 3 merge

$q_1 = q_2 + q_3 = 40$, Firm 1 is better off and 2 & 3 are worse off.

Case: All three firms merge

All three firms are better off.

7. Do yourself

8. (i) $(1+a)y_j - T \geq 2y_j$ for $j \in \{H,L\}$

(ii) High ability person go to college for $T \leq 100$

Low ability person go to college for $T \leq 80$.

(iii) Both high ability and low ability person will attain education.

(iv) Assuming tuition paid by H-type is 100 and L-type is 80. Total subsidy is $(100-60) \times 5 + (80-60) \times 5 = 300$

x solves the equation where total tax receipts equal subsidy.

$5(x/100)(150+110) = 300$

$x = 23.08\%$

9. Do yourself

10. (i) Lowest marks for which it should admit the first applicant = 50

(ii) Lowest marks for which it should admit the first applicant = 62.5

Lowest marks for which it should admit the second applicant = 50