ISI ME I - 2016

1. (c) 6
2. (b) $\frac{\partial^2 f}{\partial x^2}(x^*) \leq 0$ is a necessary condition for x^* to be a point of local maximum of f on A
3. (d) None of the above
4. (a) 924
5. (c) $\frac{2}{3}$
6. (d) 1
7. (d) $a = 1, b = 0$
8. (b) 0.35
9. (a) $(x = 1, y = 0)$ is a local maximum of f
10. (a) $\frac{x - \sqrt{3}}{1 + \sqrt{3}x}$
11. (d) $\frac{1 - 2b + ab}{2(a - b)}$
12. (b) $\{x : -2 < x < -1\} \cup \{x : 1 < x < 2\}$
13. (a) $d = \frac{1}{4}$
14. The question is not correct as F is not a valid cdf.
    We have changed the question to the following:

    Q 14* Suppose F is a cumulative distribution function of a random variable X distributed in $[0, 1]$ defined as follows:

    $$F(x) = \begin{cases} ax + b, & \text{if } x \leq a \\ x^2 - x + 1, & \text{otherwise} \end{cases}$$

    where $a \in (0, 1)$ and b is a real number. Which of the following is true?
    (a) F is continuous in $(0, 1)$
    (b) F is differentiable in $(0, 1)$
    (c) F is not continuous at $x = a$
    (d) None of the above

    A 14* (a) F is continuous in $(0, 1)$
15. (c) $x = 15, y = 5$
16. (d) 1
17. (c) $P\left(\frac{5}{4}\right) = 0$
18. (b) $\frac{C(n, 3)}{C(C(n, 2), 3)}$

19. (c) $x = \frac{1}{4}, y = \frac{1}{4}$
20. (c) $F(x) - F(y) \leq (x - y)F'(x)$
21. (d) $\frac{a}{N}$
22. (a) $\frac{t - x}{t + b}$
23. (b) 1
24. (a) 66
25. (c) $\frac{1}{2}\ln\left(\frac{5}{2}\right)$
26. (d) f has neither a maximum nor a minimum
27. (a) $\frac{(1 - p)^3}{1 - p^3}$
28. (a) $\frac{2}{15}$
29. (a) 0
30. (c) 6