

## CSL003P1M: Probability and Statistics

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### Assignment -V (Solution Key)

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Prob-1.

$$M_X(t) = \begin{cases} \frac{1}{3t}(e^{2t} - e^{-t}), & t \neq 0 \\ 1, & t = 0. \end{cases}$$

Prob-2. (a) 0.1, (b) 0.1, (c) 0.1.

Prob-3.  $e^{-\frac{6}{5}}$ .

Prob-5.  $\frac{3}{4}$ ,  $\frac{1}{2}$ .

Prob-8. (a) 92, (b) 57

Prob-9. (a)  $X \sim^d \mathcal{N}(3, 16)$  and 0.774.

Prob-10.  $b = 8 - 4\sqrt{3}$ ,  $c = 8 + 4\sqrt{3}$ .

Prob-11. (a)  $e^{-2}$ , (b)  $1 - e^{-2/3}$ , (c)  $1 - e^{-1/3}$ .

Prob-12. (i)  $M_X(t) = (1 - 2t)^{-2}$  and  $X \sim^d \chi^2(4)$  (ii)  $\beta = 2$  and  $X \sim^d \chi^2(4)$ .

Prob-13. 0.08.

Prob-14.

$$f_Y(y) = \begin{cases} \frac{1}{\sigma} \sqrt{\frac{2}{\pi}} e^{-\frac{y^2}{2\sigma^2}}, & y > 0 \\ 0, & \text{else.} \end{cases}$$