Ex. 1

$$z = x + i \cdot y \qquad \bar{z} = x - i \cdot y$$

$$(2+3i)\bar{z} + 3z = 7 + i$$

$$(2+3i)(x - i \cdot y) + 3(x + i \cdot y) = 7 + i$$

$$2x + 3x \cdot i - 2y \cdot i + 3y + 3x + 3y \cdot i = 7 + 1 \cdot i$$

$$\begin{cases} 2x + 3y + 3x = 7 & \text{(real part)} \\ 3x - 2y + 3y = 1 & \text{(imaginary part)} \end{cases} \Rightarrow \begin{cases} x = -1 \\ y = 4 \end{cases}$$

Answer: $z = -1 + 4i$

Ex. 2

Look at the solution of ex. 3 (homework 3)

Ex. 3

Look at the solution of ex. 4 (homework 6) -> use Kronecker-Capelli theorem

$\det A = a^2 - 2a - 3 = 0$ => ……

Ex. 4

$$A(X^T - I) = B$$

$$A^{-1}A(X^T - I) = A^{-1}B$$
$$X^T - I = A^{-1}B$$
$$X^T = A^{-1}B + I$$
$$X = \left(A^{-1}B + I\right)^T$$

Ex. 5

Look at the solution of ex. 4 (homework 9)

Ex. 6

Look at the solution of ex. 3 (homework 9)