Tutorial answer sheet – Determinants and inverses

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1. (a) -2;
   (b) -2;
   (c) -18.
2. (a) -12;
   (b) -12;
   (c) -15;
   (d) 15;
   (e) -9;
   (f) -9;
   (g) -15;
   (h) 15;
   (i) -9.
3. (a) -40;
   (b) -66;
   (c) 95;
   (d) 72;
   (e) 0;
   (f) 0;
   (g) 0;
   (h) $k^3 - 8k^2 - 10k + 95$;
   (j) -240.
4. $t = 0$, $t = -1$, $t = 2$.
5. (a) true;
   (b) true;
   (c) false;
   (d) true;
   (e) false;
   (f) true.
6. 6.

7. (a) $3\mathbf{A} - \mathbf{B} = \begin{bmatrix} 13 & -10 \\ -18 & 11 \end{bmatrix}$

   (b) $\mathbf{A}^2 = \begin{bmatrix} 14 & -5 \\ -25 & 9 \end{bmatrix}$

   (c) $\mathbf{A}^{-1} = \begin{bmatrix} 2 & 1 \\ 5 & 3 \end{bmatrix}$, $\mathbf{B}^{-1} = \begin{bmatrix} 5 & 7 \\ 3 & 4 \end{bmatrix}$

   (d) -

   (e) -

8. (a) $\mathbf{X} = \begin{bmatrix} 1 & 2 \\ 4 & 7 \end{bmatrix}$;

   (b) $\mathbf{Y} = \begin{bmatrix} 4 & 2 \\ 1 & 0 \end{bmatrix}$;

   (c) $\mathbf{Z} = \begin{bmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{2} & 4 \end{bmatrix}$.

9. $\mathbf{Y}^{-1} = \frac{1}{152} \begin{bmatrix} 2 & -16 & -2 \\ -20 & 8 & 20 \\ 77 & -8 & -1 \end{bmatrix}$.

10. $a = 16$, $b = 2$, $c = 4$ and $d = 2$.

11. $a = 27$, $b = -6$, $c = -3$ and $d = -\frac{3}{2}$.