Exercise-set 8.
Solutions

1. $(-1)^{n(n-1)/2}$.

2. $+1$ or -1.

3. a) $(-1)^4 \cdot 2 \cdot 3 \cdot 5 \cdot 4 \cdot 1 = 120$.
   b) $(-1)^5 \cdot 5 \cdot 2 \cdot 2 \cdot 3 \cdot 1 + (-1)^8 \cdot 5 \cdot 6 \cdot 2 \cdot 1 \cdot 1 = 0$.
   c) 0 (all the elementary products are 0).
   d) $(-1)^4 \cdot 3 \cdot 2 \cdot \sqrt{5} \cdot 4 \cdot 2 + (-1)^7 \cdot 8 \cdot 1 \cdot \sqrt{5} \cdot 2 \cdot 3 = 0$.

4. a) 2,
   b) $+$ (inversion number is 6).

5. a) Only the entries on the main diagonal are not divisible by 5,
   b) Only the entries on the main diagonal are not even.

6. All the elementary products are 0.

7. All the elementary products are 0.

8. a) -112,
   b) 40,
   c) 8,
   d) 0.

9. -360

10. a) $(n-1)!$,
    b) 0, if $n \geq 3$; 2, if $n = 1$; 9, if $n = 2$,
    c) $(-1)^{n-1} \cdot (n-1)$.
    d) 0, if $n \geq 2$,
    e) 1,
    f) 0, if $n \geq 3$; 10, if $n = 1$; -10, if $n = 2$.

11. If we add the first row to the others, then those rows will be divisible by 2.

12. 0 (by the addition property).

13. We divide the second and fourth row by 4 and multiply second and fourth column by 4.

14. 0 (if we add the second and third columns to the fourth one).

15. a) gets multiplied by 2^{10},
    b) doesn't change,
    c) doesn't change.

16. Add all the columns to the given one, then divide by 2008.

17. a) $-4p + 12$,
    b) $-42p$.