Solutions to Practice Problems

1.

a. …, -43, -17, 9, 35, 61, …
b. …, -22, -18, -14, -10, -6, …
c. …, 5, 13, 21, 29, 37, …
d. …, 1, 6, 11, 16, 21, …

2.

a. 2
b. 0
c. 4
d. 14

3.

a. 31^2
b. $2 \cdot 3 \cdot 5 \cdot 7 \cdot 11$
c. $7^3 \cdot 19$

4.

a. Not relatively prime
b. Relatively prime
c. Relatively prime
d. Not relatively prime

5.

a. Any numbers that lack 3 or 5 as a factor
b. Any numbers that lack 2, 3, or 5 as a factor
c. Any numbers that lack 2, 4, or 31 as a factor
d. Any numbers that lack 2 as 5 factor

6.

a. 1, 2, 7, 14
b. 1, 5, 25
c. 1, 2, 13, 26

7.

a. 23
b. 1
c. 61

8.

a. $s = 2$, $t = -3$
b. $s = -53$, $t = 294$
c. $s = 15$, $t = -314$

9.

a. 210
b. 2520
c. 35
d. 21

10.

a. 3744
b. 5148 (if you also count straight flushes and royal flushes)
c. 10240 (if you count straight flushes and allow both Ace-2-3-4-5 and 10-Jack-Queen-King-Ace)
d. 54912

11.

a. 17,576,000
b. 1/1000, assuming order matters, and fudging just a bit—it's actually $(26^3-1)/17{,}576{,}000$, which is just a hair under 1/1000, since you can't pick the exact same license plate twice
c. 6000
d. ≈11.1%. Hint: How many license plates have exactly one D? How many have exactly two Ds? How many have exactly three Ds?

12.

a. ≈7.91%
b. ≈.0977%
c. ≈76.3%

13.

a. 33
b. 48
c. 171
d. 511

14.

a. 1 000 000
b. 10 000 001
c. 110 101

d. 100 010 111

15.

a. 110 000
b. 1 000 100

16.

a. 19
b. 13
c. 190