R.1.2

$10n\log n \le n^2$

$10\log n \le n$

$\log n^{10} \le n$

$\log n \le \frac{n}{10}$

$10^{\log n} \le 10^{n/10}$

$1 \times n \le 10^{n/10}$

$n^{10} \le 10^n$

$b^{\log_b a} = a^c$

$\times n=2 \quad 1024 < 100$

$\vdots$

$\times n=9 \quad 3486784401 < 1000000000$

$\checkmark n=10 \quad 10^{10} \le 10^{10}$

$\Rightarrow$

R 1.6

| | | | |
|---|---|---|---|
| (1) $4^n$ | (2) $2^n$ | (3) $n^3$ | (4) $n^2 \log n$ |
| (5) $4^{\log n}$ | (6) $4n^{3/2}$ | (7) $2n\log^2 n$ | (8) $n \log n$ |
| (9) $5n$ | (10) $\sqrt{n}$ | (11) $\log\log n$ | (12) $1/n$ |

R 1.10

```
Algorithm Loop1(n)
  s ← 0                      O(1)
  for i ← 1 to n do          O(1) + O(n)
      s ← s + i              O(1) + O(n)
```

$2n+3$

$O(n)$

R 1.14

```
Algorithm Loops(n)
  s ← 0                      O(1)
  for i ← 1 to n² do         1 + n²
    for j ← 1 to i do        n⁴
      s ← s + i              n⁴
```

$n^4$