Exercise 27

$$A \vee B = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 0 & 1 \end{bmatrix}$$

$$A \wedge B = \begin{bmatrix} 0 & 0 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$\boxed{A \odot B} = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 0 & 1 \end{bmatrix}$$

53) Procedure change (q, d, n, p ; 51

~~for i = 1 to 4 :~~

~~$d_i := 0$~~

~~while $n \geq$~~

$51 = 2q + p$

$69 = 2q + d + n + 4p$

$76 = 3q + p$

$60 = 2q + d$

55) $51 = 2q + p$

- $69 = 2q + d + 4p$
- $76 = 3q + p$
- $60 = 2q + d$

a, c, d

56) $15 \to 1 \cdot (12) + 3p$ vs. $1d + 1n$

27a) $n \log(n^2+1) + n^2 \log(n) \leq n \log 2 + 2n \log n + n^2 \log n$

$n \cdot k + n(2 \log n + n \log n) \leq nk + n(2n \lg n)$

$\leq 3n^2 \lg n = O(n^2 \lg n)$

27b) $(n \log n+1)^2 + (\log n + 1)(n^2+1)$

$\leq n^2 (\lg 2n)^2 + (\lg 2n)(2n^2)$

$\leq n^2 (\lg 2n)^2 + 2n^2 \lg 2n$

$\leq 3n^2 (\lg 2n)^2 \leq O(n^2 (\lg n)^2)$

30c $x + \frac{1}{2}$ is of order x^1

$\Downarrow$

$\lfloor x + \frac{1}{2} \rfloor$ is of order x^1

30e $\lg_{10}(x) = \lg_2(x) \cdot \lg_{10}(2)$

$= k \cdot \lg_2(x)$

This gives an order of $\lg_2(x)$

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$3x^2 + x + 1$

$(x+1) \leq x^2$, $x \geq 2$

$3x^2 + x^2 = 4x^2$

$3x^2 + x + 1 \geq 3x^2$, $x \geq -1$

$f(x) = 3x^2 + x + 1$

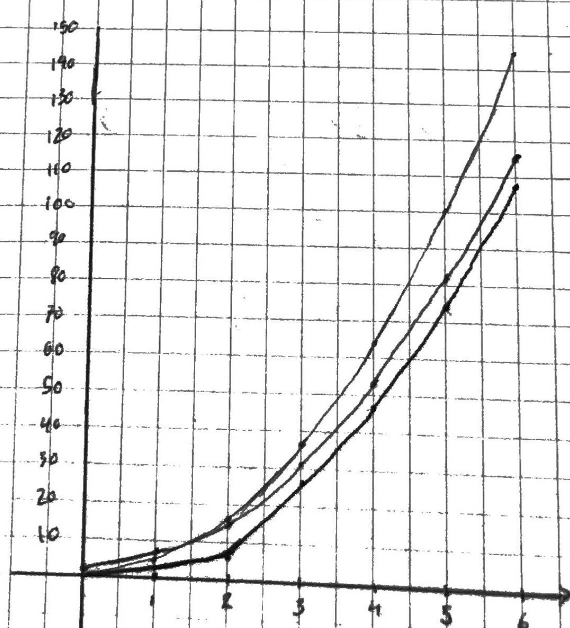
$g(x) = 3x^2$

$C_1 = 1$, $C_2 = \frac{4}{3}$, $K = \max\{-1, 2\} = 2$

= $3x^2 + x + 1$

= $4x^2$

= $3x^2$



from $2 \leq K$:

$3x^2 \leq 3x^2 + x + 1 \leq 4x^2$

42 : yes, since $g(x) \geq f(x)$, $2^{g(x)} \geq 2^{f(x)}$
and $2^{f(x)} = O(2^{g(x)})$

$\boxed{\text{Section 4.1}}$

11. $(11 + 80) \% 12$

$= 91 - 84 = \underline{\underline{7:00}}$

b) $(12 - 40) \% 12$

$= -28 + 36 = 8:00$

c) $(100 + 6) \% 12$

$= 106 - 96 = \underline{\underline{10:00}}$