PC Sec 2-6 p. 122 (1-13)

① $f(x) = ax^2 + bx + c$

② $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

③ R: $\{y \mid y \geq -3.125\}$

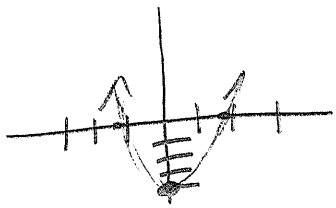
④ a) y-int: $\boxed{(0, -4)}$

x-int $a = 2 \quad b = -1 \quad c = -4$

$x = \dfrac{-(-1) \pm \sqrt{(-1)^2 - 4(2)(-4)}}{2(2)}$

$x = \dfrac{1 \pm \sqrt{33}}{4}$ $\boxed{x = \dfrac{1 + \sqrt{33}}{4} \qquad x = \dfrac{1 - \sqrt{33}}{4}}$

b)



c) Vertex $\boxed{\left(\frac{1}{4}, -4.125\right)}$

$x = \dfrac{-b}{2a} = \dfrac{-(-1)}{2(2)} = \dfrac{1}{4}$

$y = 2(1/4)^2 - (1/4) - 4 = -4.125$

⑤ a) min b) min c) max d) max

⑥ a) $h = -\frac{1}{2}(1.6)t^2 + 20t + 15 \rightarrow \boxed{h = -0.8t^2 + 20t + 15}$

b) $h = -0.8(3)^2 + 20(3) + 15 = \boxed{67.8 \text{ m}}$

c) $0 = -0.8t^2 + 20t + 15$

$a = -0.8 \quad b = 20 \quad c = 15$

$x = \dfrac{-(20) \pm \sqrt{(20)^2 - 4(-0.8)(15)}}{2(-0.8)}$

$x = \dfrac{-20 \pm \sqrt{448}}{-1.6}$ $x = -0.729$ sec

imaginary

$\boxed{x = 25.729 \text{ sec}}$

⑦ $f(4) = 3(4)^2 - 20(4) + 8 = -24$

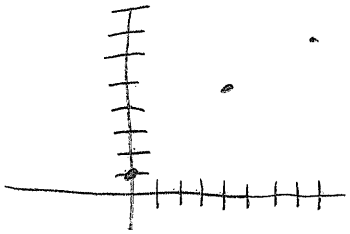
⑧ $f(x) = 3x^2 - 20x + 8$

(9) a) $y = -1.0x^2 + 7.2x + 9.3$

$y = -1.0(4.5)^2 + 7.2(4.5) + 9.3 = \boxed{21.452}$

b) Interpolation

(10) a)



(1,1), (4,5), (8,7)
x y x y x y

★ answer to estimated vertex will vary: (10,8)

b) $y = ax^2 + bx + c$

$1 = a(0)^2 + b(0) + c \rightarrow 1 = 0a + 0b + c$

$5 = a(4)^2 + b(4) + c \rightarrow 5 = 16a + 4b + c$

$7 = a(8)^2 + b(8) + c \rightarrow 7 = 64a + 8b + c$

$$\begin{bmatrix} 0 & 0 & 1 \\ 16 & 4 & 1 \\ 64 & 8 & 1 \end{bmatrix} \begin{bmatrix} a \\ b \\ c \end{bmatrix} = \begin{bmatrix} 1 \\ 5 \\ 7 \end{bmatrix}$$

$[A] \quad [X] \quad [B]$

$[X] = [A]^{-1}[B]$

$\boxed{y = -0.0625x^2 + 1.25x + 1}$

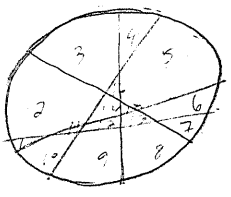
c) Vertex $(x, y) \rightarrow \boxed{(10, 7.25)}$

$x = \frac{-b}{2a} = \frac{-1.25}{2(-0.0625)} = 10$

$y = -0.0625(10)^2 + 1.25(10) + 1 = 7.25$

(11) a) $y = 0.5x^2 + 0.5x + 1$

b) $y = 0.5(5)^2 + 0.5(5) + 1 = \boxed{16}$



(12) a) $V = 1.185 - (185 \cdot 10^4) r^2$

$$X = \frac{-1.185}{2(-185 \cdot 10^4)}$$

$V = 1.185 - (185 \cdot 10^4)(3.203 \times 10^{-7})$

$\boxed{V = 1.185 \text{ cm/sec}}$

b) $V = 1.185 - (185 \cdot 10^4)(6 \cdot 10^{-4})^2$

$\boxed{V = 0.519 \text{ cm/sec}}$

c) $0 = 1.185 - (185 \cdot 10^4)(r^2)$

$-1.185 \quad -1.185$

$$\frac{-1.185}{-185 \cdot 10^4} = \frac{-185 \cdot 10^4 r^2}{-185 \cdot 10^4}$$

$\sqrt{r^2} = \sqrt{6.405 \times 10^{-7}}$

$\boxed{r = 8 \times 10^{-4} \text{ cm}}$

d) $0 \leq r \leq 0.0008$

e) Calc

(13) a) Calc

b) $y = -46.393x^2 + 620.48x - 120.6$

c) $y = -46.393(14)^2 + 620.48(14) - 120.6 = \boxed{-526.9}$

d) Neg. value would indicate importing but tank had stopped due to cor.