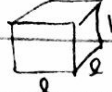


Lesson 26

1.  $V = l^2 h$, $3l^2 + 1l^2 + 2(4lh) = 108$

① $2lh = \lambda(8l + 8h) \xrightarrow{\text{sub } \lambda = \frac{1}{8}} 2lh = l^2 + lh \rightarrow h = l$
 ② $l^2 = \lambda(8l) \rightarrow \lambda = \frac{l}{8}$ OR $l = 0$
 ③ $4l^2 + 8lh = 108$

$4l^2 + 8l^2 = 108$ $l = 3, h = 3 \rightarrow V = 27 \text{ m}^3 \times \frac{100^3 \text{ cm}^3}{\text{m}^3}$
 $12l^2 = 108 \rightarrow \boxed{V = 27,000,000 \text{ cm}^3}$
 $l = \neq 3$

2. $S = 20 + x(20-x) + y(16-y) - (x+y)^2$, $x+y = 8$

① $20 - 2x - 2x - 2y = \lambda \rightarrow 20 - 4x - 2y = 16 - 2x - 4y$
 ② $16 - 2y - 2x - 2y = \lambda \xrightarrow{\text{set}} 4 + 2y = 2y$
 ③ $x + y = 8$
 $2y + 2 = 8 \xrightarrow{\text{sub } y = 4 + 2} \text{ into } \textcircled{3} x = y + 2$
 $y = 3, x = 5 \rightarrow \boxed{S = 70 \text{ pts}}$

3. $f(x,y) = y^2 - x^2 + 25$ $x^2 + y^2 = 25$

① $-2x = \lambda(2x) \xrightarrow{\text{sub}} x = 0$
 ② $2y = \lambda(2y) \rightarrow \lambda = 1$ OR $y = 0$
 ③ $x^2 + y^2 = 25$

(x,y)	$f(x,y)$
$(0, \pm 5)$	50°C
$(\pm 5, 0)$	0°C

4. Value = $x+y$, $(x-5)^2 + 16(y-10)^2 = 68$

① $1 = \lambda(2x-10) \rightarrow \frac{1}{2x-10} = \frac{1}{32y-320}$
 ② $1 = \lambda(32y-320) \rightarrow 32y-320 = 2x-10$
 ③ $(x-5)^2 + 16(y-10)^2 = 68$
 $(11y-110)^2 + 16(y-10)^2 = 68 \xrightarrow{\text{sub } x = 11y - 155} \text{ into } \textcircled{3} x = 11y - 155 \textcircled{4}$
 $272(y-10)^2 = 68$

$y = 10 \pm \sqrt{68/272} = 10 \pm \frac{1}{2} = 9.5, 10.5$
 ~~$(-3, 9.5)$~~ OR $(13, 10.5) \rightarrow S = \$23.5 \text{ hundred} = \boxed{\$2350}$
 (by ④)