

Mr Lee's Backyard design
Situational Problem
Answer key.

Deck: $2(x-1) + 2x + 7 = 13$

$2x - 2 + 2x + 7 = 13$

$4x + 5 = 13$

$4x = 8$

$x = 2$

The deck is $(2x+7) \times (2x+7)$

$= 2(2)+7 \times 2(2)+7$

$= 11 \times 11$

$= 121 \text{ m}^2$

• Cost to install deck = $121 \times 100 = \underline{\underline{\$12,100}}$

Lights: $c^2 = a^2 + b^2$

$= 11^2 + 11^2$

$c = \sqrt{242}$

$= 15.5$

2 strings = 2×15.5

$= 31$

$\therefore 31 \div 8\text{m} = 3.8$

\therefore 4 packages needed.

• Cost of lights = $4 \times 40 = \underline{\underline{\$160}}$

Flower bed: dimensions: $(x-1) \times (2x+7)$

$= (2-1) \times (2(2)+7)$

$= 1 \times 11$

2 flower beds have total area: $11 \times 2 = 22 \text{ m}^2$

• Cost of dirt = $22 \times 15 = \underline{\underline{\$330}}$

Sub Total = $12100 + 160 + 330 + 10000 + 2200 + 9200$

$= 34,990$

Tax = 14548.70

Total = 63958.70

Pool: Area of pool = Total area - Area of interlock

$$\begin{aligned} &= (4y+2)^2 - (12y^2 + 16y + 8) \\ &= 16y^2 + 16y + 4 - 12y^2 - 16y - 8 \\ &= 4y^2 - 4 \end{aligned}$$

$$30 \leq \text{Area of pool} \leq 35$$

$$30 \leq 4y^2 - 4 \leq 35$$

$$34 \leq 4y^2 \leq 39$$

$$8.5 \leq y^2 \leq 9.75$$

$$2.9 \leq y \leq 3.12$$

$$\therefore \underline{y=3}$$

\therefore Pool is 8m x 4m with area 32m²
Cost of pool is fixed: \$10,000

Interlock: $12y^2 + 16y + 8$

$$y=3: = 12(3)^2 + 16(3) + 8$$

$$= 108 + 48 + 8$$

$$= 164 \text{ m}^2$$

Cost of interlock = $164 \times 50 = \$8200$

Fence: $4(4y+2)$

$$y=3 \Rightarrow 4(4(3)+2)$$

$$= 4(14)$$

$$= 56 \text{ m}$$

Cost of fence = $56 \times 75 = \$4200$

Sub Total = $12100 + 160 + 330 + 10,000 + 8200 + 4200$
 $= \$34,990$

Tax = \$4548.70

Total = \$39,538.70

\therefore Yes with \$461.30 Remaining