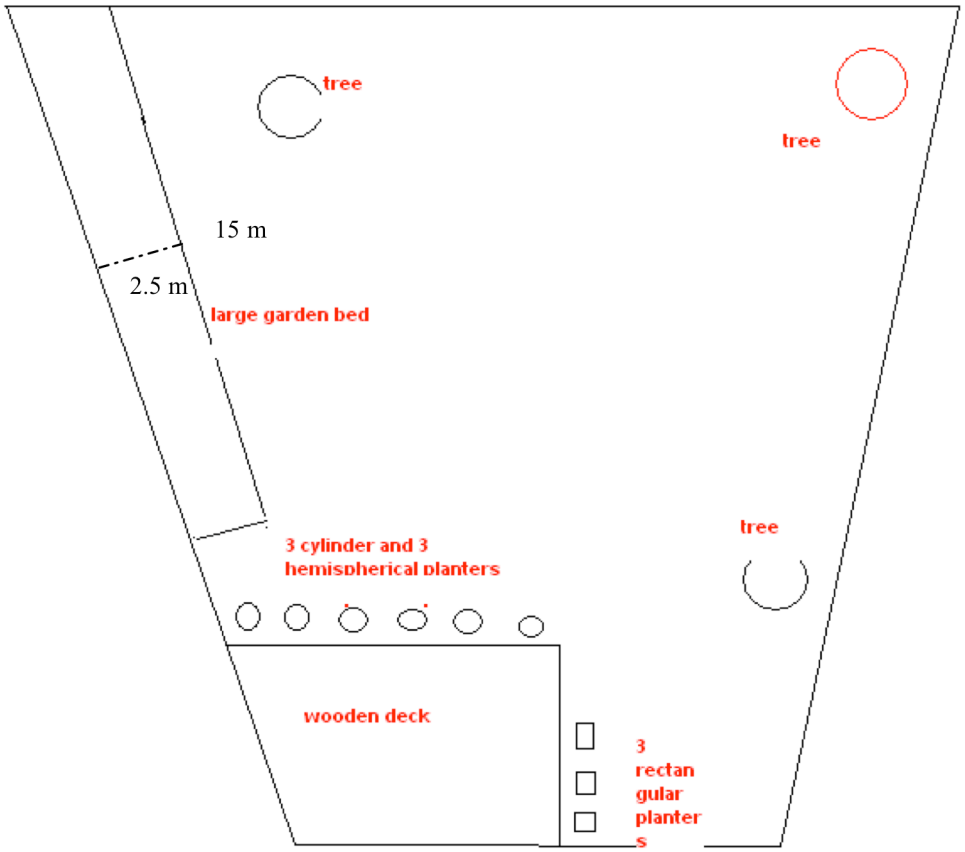
Task
Landscape Design

Sample Solution
This is my final design. I included a deck and three trees.



2. Calculate amount of topsoil needed for each type of planter.
Cylinder planter: $V = \pi r^2 h$
$= \pi \times 0.15^2 \times 0.45$
$\doteq 0.032$

Semi-hemispherical planter: $V = \frac{4}{3}\pi r^3$
$= \frac{4}{3}\pi \times 0.3^3$
$\doteq 0.113$

Rectangular-prism planter: $V = l \times w \times h$
$= 0.3 \times 0.2 \times 0.2$
$= 0.012$

For my design, I used three cylindrical planters, three semi-hemispherical planters, and three rectangular planters.

Volume of topsoil needed for planters = 3(0.032) + 3(0.113) + 3(0.012)
= 0.471
My design requires 0.471 m^3 of topsoil for planters.

Calculate the amount of topsoil needed for the garden bed. Topsoil should be laid to a depth of 6 cm, or 0.06 m.

The garden bed is approximately rectangular.
Volume of topsoil for garden bed = Area of garden bed $\times$ 0.06
$= 15 \times 2.5 \times 0.06$
$= 2.25$
I need 2.25 m^3 of topsoil for the garden bed.

Total amount of topsoil required = 0.471 + 2.25
= 2.721
Altogether, my design requires 2.721 m^3 of topsoil.

3. I will use medium plants in all the round planters.
Cylindrical planters can fit one plant each. $1 \times 3 = 3$
Semi-hemispherical planters can fit four plants each. $4 \times 3 = 12$

I will use small plants in all the rectangular planters.
Rectangular planters can fit two plants each. $2 \times 3 = 6$

I will use very large and large plants for the garden bed and will fill half of area with each type.
Area of garden bed $= 15 \times 2.5$
$= 37.5$
The total area of the garden bed is 37.5 m^2.
Plant $37.5 \div 2$, or 18.75 m^2 with very large plants, and the remainder with large plants.

Approximate area of very large plant = πr^2
$= \pi(1)^2$
$\doteq 3.14$
$18.75 \div 3.14 \doteq 6$
Plant six very large plants in the garden bed.

Approximate area of large plant = πr^2
$= \pi(0.6)^2$
$\doteq 1.13$
$18.75 \div 1.13 \doteq 16$
Plant 16 large plants in the garden bed.

My garden design requires six small plants, 15 medium plants, 16 large plants, and six very large plants.

4. I found that the price of trees depends on the size and type of tree. A very small tree or bush costs approximately $20 but a larger tree can cost as much as $5000.