

Worksheet: Optimizing Perimeter and Area

1. Farmer Fran has 30 segments of 2 metre fence rails to build a pen for her sheep.
 - a. What are the dimensions of the pen with the maximum possible grazing area for the sheep, assuming the fence rails cannot be cut?

 - b. How does your answer change if the fence rails can be cut? How much additional area does this provide?

2. The Andersons are planning to put up a fence to enclose an area for their dogs to run. They have 40 metres of fencing and plan to use the side of their house for one side of the enclosure (so they will only need fencing on 3 of the sides).
 - a. Determine the dimensions of the enclosure that will provide the maximum area for the dogs to run.

 - b. What is the area of the enclosure?

3. Alex is building a garden in his large backyard. He has 144 feet of fencing to enclose his garden.
 - a. Suppose he builds the garden in the middle of the backyard. What are the dimensions of the garden with the largest area and what is the area of the garden?

 - b. Suppose he uses the back of his house as one side of the garden. What are the dimensions of the garden with the largest area and what is the area of the garden?

 - c. Suppose he builds the garden in the back corner of his property which is already fenced. In other words, he only needs to fence in 2 of the sides. What are the dimensions of the garden with the largest area and what is the area of the garden?

Answers

- 1a) 14 m by 16 m b) 15 m by 15 m; 1m^2 is added
2a) 20m by 10m b) 200 m^2
3a) 36 ft by 36 ft ; 1296 ft^2 b) 72 ft by 36 ft; 2592 ft^2 c) 72 ft by 72 ft; 5184 ft^2