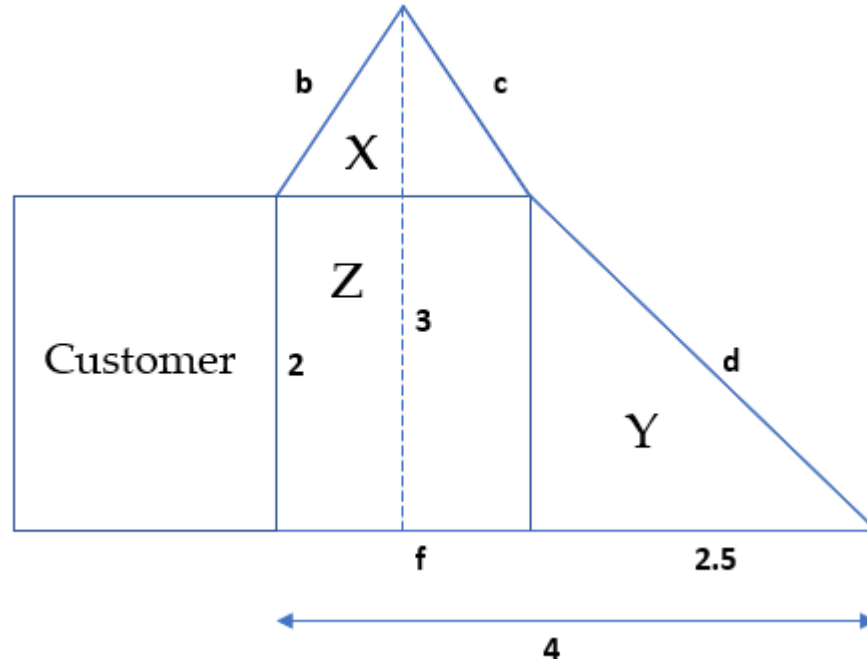


### ANSWERS

**Level 1:** The first step to solving this problem is to write out what is given in the problem statement, as shown in the figure below.



Now that we have visualized what is already known about the land parcels, it will be easier to step through the process of finding the different lengths. Let's start with length  $f$ . It is equal to the total width of the land parcels minus the width of parcel Y, so length  $f$  is equal to 1.5 kilometers. Now that length  $f$  is known, we have everything we need to finish this first problem. We can solve for parcel X first. We know that the width of parcel X is equal to length  $f$  (2.5 kilometers), and the height of parcel X is equal to the total height of the parcel minus length  $f$ , so the height of parcel X is equal to 1 kilometer. The base and height of parcel X are known, but how can we solve for lengths  $b$  and  $c$ ? Using the handy Pythagorean Theorem (as seen below)!

$$C^2 = A^2 + B^2$$

Where  $C$  is the hypotenuse,  $A$  is the width, and  $B$  is the height of a right triangle. Applied to parcel X, this becomes:

$$c = \sqrt{\left(\frac{1.5}{2}\right)^2 + (1)^2}$$

And so, we get length  $c$  on parcel X is equal to 1.25 kilometers. Remembering that parcel X is an isosceles triangle also provides length  $b$ , which is equal to length  $c$ .

The last dimension we need solve for is length d on parcel Y. Similar to Parcel X, we can use the Pythagorean theorem to solve for length d.

$$d = \sqrt{2.5^2 + 2^2}$$

Solving for length d gives a distance of 3.2 kilometers. All dimensions of parcels X, Y, and Z are solved, so we can move on to the level 2 question!

**Level 2:** To solve for the total area of purchased parcels, we use basic area equation for triangles and rectangles. Shown below is the total area equation for the shape.

$$Area = (a * f) + \left(\frac{1}{2}\right) * (a) * (e) + \left(\frac{1}{2}\right) * (1) * (f)$$

Plugging in values gives a total area of 4.75 km<sup>2</sup>. The conversion to acres can be seen below.

$$(4.75 \text{ km}^2) * \left(\frac{247.105 \text{ acres}}{1 \text{ km}^2}\right)$$

The conversion comes out to 1173.7 acres.