2. [9 points] Consider a right triangle with legs of length $x$ ft and $y$ ft and hypotenuse of length $z$ ft, as in the following picture:

![Diagram of a right triangle]

a. [2 points] Suppose that the perimeter of the triangle is 8 ft. Let $A(x)$ give the area of the triangle, in ft\(^2\), as a function of the side length $x$. In the context of this problem, what is the domain of $A(x)$? Note that you do not need to find a formula for $A(x)$.

Answer: 

b. [7 points] Suppose instead that the perimeter of the triangle is allowed to vary, but the area of the triangle is fixed at 3 ft\(^2\). Let $P(x)$ give the perimeter of the triangle, in ft, as a function of the side length $x$.

(i) In the context of this problem, what is the domain of $P(x)$?

Answer: 

(ii) Find a formula for $P(x)$. The variables $y$ and $z$ should not appear in your answer.

(This is the equation one would use to find the value(s) of $x$ minimizing the perimeter. You should not do the optimization in this case.)

Answer: $P(x) =$