by Benjamin Bloch, Ph.D.

1- Area = ½ base x height
From the apex drop a perpendicular to the base. The triangle being isosceles has equal base angles so that the perpendicular is also an angle bisector.
The height of the perpendicular bisector equals s cosθ, and the base equals 2s sin θ
Therefor the area $A = s^2 \sin\theta \cos\theta$.
We want $dA/d\theta = 0$. Since $(d/d\theta) \sin\theta = \cos\theta$ and $(d/d\theta) \cos\theta = -\sin\theta$
We get $dA/d\theta = s^2 (\cos^2\theta - \sin^2\theta) = 0$.
Therefore $\cos\theta = \sin\theta$, $\theta = 45$ degrees, and thus the included angle is $2\theta = 90$ degrees.

2- $\sin 45 = \cos 45 = 2^{1/2}/2$, so that the maximum area = ½ s^2.

3- $P = s(2 + 2^{1/2})$.