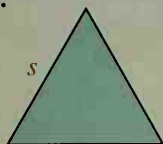## ◆ Calculator Key-In

1. The purpose of this exercise is to suggest the following statement: Of all figures in a plane with a fixed perimeter, the circle has the greatest possible area. If each regular polygon below has perimeter 60 mm and the circle has circumference 60 mm, find the area of each to the nearest square millimeter.
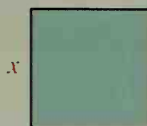
a.

$s =$ ___?___
$A \approx$ ___?___

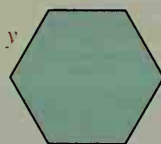**b.**

$x =$ ___?___
$A =$ ___?___

c.

$y =$ ___?___
$A \approx$ ___?___

d.
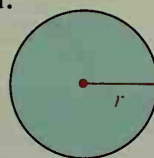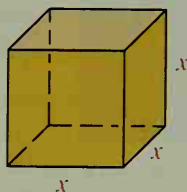

$r \approx$ ___?___
$A \approx$ ___?___

2. The regular pyramid, the cube, and the sphere below all have total surface area 600 mm^3. Find the volume of each to the nearest cubic millimeter.
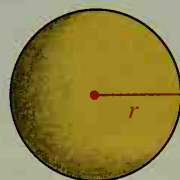
a.
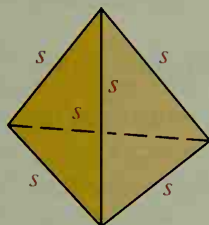
$\text{T.A.} = 4\left(\dfrac{s^2\sqrt{3}}{4}\right) = 600 \text{ mm}^2$

$s \approx$ ___?___

$V = \dfrac{s^3\sqrt{2}}{12} \approx$ ___?___

(See Ex. 29, page 486.)

b.

$\text{T.A.} = 6x^2 = 600 \text{ mm}^2$

$x =$ ___?___

$V = x^3 =$ ___?___

c.

$\text{T.A.} = 4\pi r^2 = 600 \text{ mm}^2$

$r \approx$ ___?___

$V = \dfrac{4}{3}\pi r^3 \approx$ ___?___

d. Use the results of parts (a)–(c) to complete the following statement, which is similar to the one in Exercise 1: Of all solid figures with a fixed ___?___, the ___?___ has the ___?___.

★ 3. Suppose the plane figures in Exercise 1 all have area 900 cm^2. Find the perimeter of each polygon and the circumference of the circle to the nearest centimeter. What do your answers suggest about all plane figures with a fixed area?

★ 4. Suppose the solid figures in Exercise 2 all have volume 1000 cm^3. Find the total surface area of each to the nearest square centimeter. What do your answers suggest about all solid figures with a fixed volume?