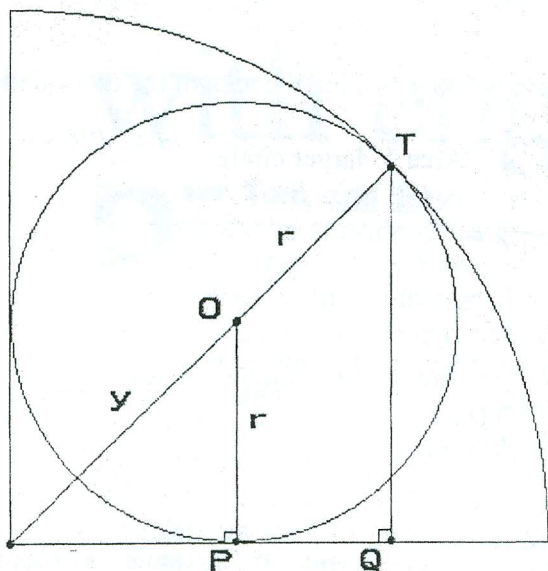


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3. Label the point of tangency between the smaller circle and the horizontal segment **P**.

4. Draw $\overline{OP}$.

5. Drop a perpendicular from **T** to the horizontal segment.

SEE THE FIGURE AT LEFT

6. Why is $\triangle OPM$ a right triangle? *Bisecting*

7. $m\angle OMP = 45^\circ$. Why? *bisected right angle*

8. Why is $OP = PM$?

*Since $\angle O + \angle M = 45^\circ$
then corresponding sides are $\cong$.*

$$y = \sqrt{2}r$$

9. Find y in terms of r .

$$y^2 = r^2 + r^2 = y^2 = 2r^2$$

10. So, $y + r = (\sqrt{2}r) + r = r(\sqrt{2} + 1) =$ cm.

$$50 \text{ cm} = r(\sqrt{2} + 1)$$

11. $r = 20.75 \text{ cm}$

$$50 = 2.41r$$

$$20.75 = r$$

12. Area of circle **O** is ____.

$$A_0 = \pi r^2 = \pi (20.75^2) = 1352.65$$

13. Area of all four circles is ____.

$$1352.65 \times 4 = 5410.61$$

14. Area outside four circles is ____.

$$\text{Area of big circle} - \text{area of small (4) circles}$$

$$7854 - 5410.61 = 2443.37$$

15. What percent of the large circular region is outside the four smaller circles?

$$\% \text{ waste} = \frac{2443.37}{7854} = .31 = 31\%$$

16. Compare your answer in Part 2, #15 with your answer in Part 1, #4.

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