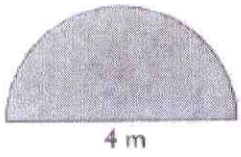
MATH 304 Circles Name SOLUTION KEY Seat # _____

1. The figure shows a semicircular flowerbed. Find the length of decorative edging needed to go all the way around the flowerbed.

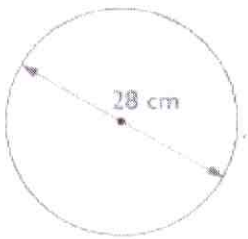


Perimeter $= 4 + \underbrace{\frac{1}{2}(4\pi)}_{\text{Semi-circle}}$

$= 4 + 2\pi$

$\approx 4 + 6.28 \approx$ **10.28 m**

2. Find the area and perimeter of this circle using $\pi \approx \frac{22}{7}$.

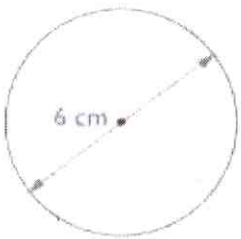


$r = 14$ cm

$C = \pi d = 28\pi = 28\left(\frac{22}{7}\right) = \frac{4}{\cancel{28}}\left(\frac{22}{\cancel{7}}\right) =$ **88 cm**

$A = \pi r^2 = \pi(14^2) = \frac{22}{\cancel{7}} \cdot \frac{\cancel{14}^{2}}{1} \cdot \frac{14}{1} =$ **616 cm²**

3. Find the area and circumference of this circle using $\pi \approx 3.14$.

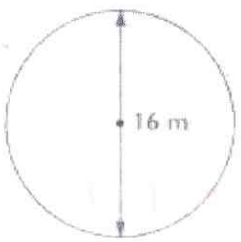


$r = 3$ cm

$C = \pi d = 6\pi \approx 6(3.14) \approx$ **18.84 cm**

$A = \pi(3^2) = 9\pi \approx$ **28.26 cm²**

✱ 4. Find the exact area and perimeter of this circle (give answer in terms of π).



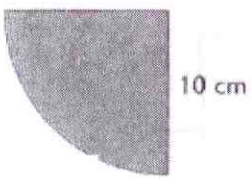
$C = P =$ **16π m**

$A = \pi r^2 = \pi(8^2) =$ **64π m²**

$16 \times \frac{3}{48}$

$64 \times \frac{3}{192}$

5. Find the area and perimeter of the shaded region using $\pi \approx 3.14$.



$P = 10 + 10 + \frac{1}{4}(C)$

$= 20 + \frac{1}{4}(20\pi)$

$= 20 + 5\pi$

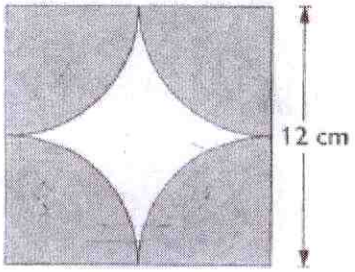
$= 20 + 15.7 =$ **35.7 cm**

$A = \frac{1}{4}(\pi r^2) = \frac{1}{4}(\pi \cdot 10^2)$

$\approx \frac{1}{4}(314)$

$\approx$ **78.5 cm²**

6. Find the area of the shaded region. Use $\pi \approx 3.14$.



4 quarter circles = 1 full circle

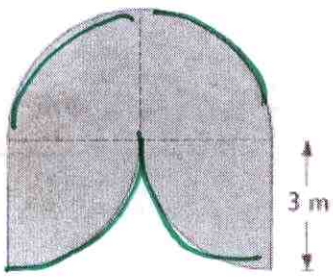
$A = \pi r^2$

$= \pi(6^2)$ ← radius is $\frac{1}{2}(12)$

$= 36\pi$

$\approx 113.04\ cm^2$

7. Find the area and perimeter of the shaded region. Use $\pi \approx 3.14$.



4 quarter circles = 1 full circle

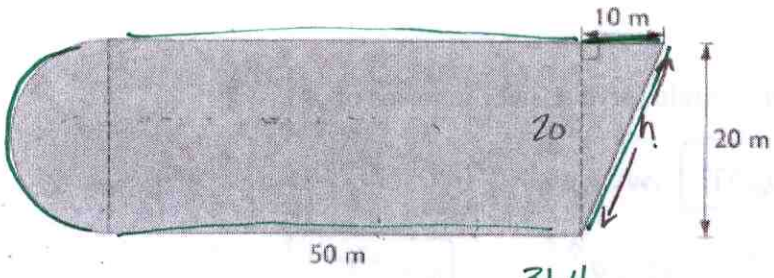
P = all of circum + 3 + 3 (straight edges)

$= 6\pi + 6$

$= \boxed{24.84\ m}$

$A = \pi r^2 = \pi \cdot 3^2 = 9\pi \approx \boxed{28.26\ m^2}$

8. Find the area and perimeter of this shaded region. Use $\pi \approx 3.14$



→ PYTHAG: $20^2 + 10^2 = h^2$

$400 + 100 = h^2$

$500 = h^2$

$22.36 \approx h$

Area = $\frac{1}{2}$ circle + rect + triangle

$= \frac{1}{2}\pi(10^2) + 50(20) + \frac{1}{2}(20)(10)$

$\approx 157 + 1000 + 100$

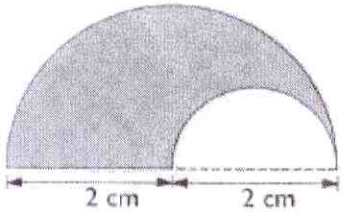
$\approx \boxed{1257\ m^2}$

$P = 50 + 22.36 + 10 + 50 + \frac{1}{2}(20\pi)$ (31.4)

$\approx$ ~~396.36 m~~ ~~163.76 m~~ 163.76

110 + 22.36 + 31.4 = 163.76

9. Find the area of the shaded region. Use $\pi \approx 3.14$.



Area large semi − Area Small semi

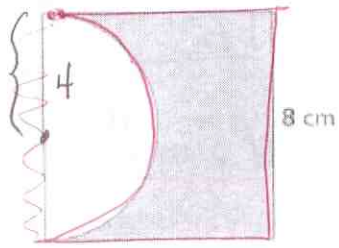
$\frac{1}{2}(\pi(2^2)) - \frac{1}{2}(\pi(1^2))$

$2\pi - \frac{1}{2}\pi$

$6.28 - 1.57 = \boxed{4.71\ cm^2}$

314 · 110 · 22.36

10. The figure shows a square and a semicircle. Find the area and perimeter of the shaded region.
Use $\pi \approx 3.14$



AREA

Square − Semicircle

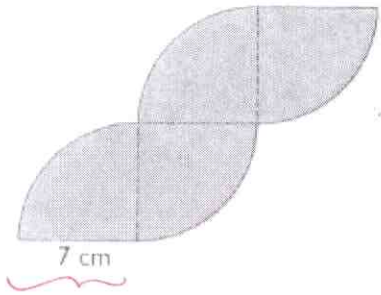
$(8\times8) - \frac{1}{2}(\pi \cdot 4^2) \approx 64 - 25.12 \approx$ 38,88 cm²

Perimeter = 8+8+8 + ½ Circumference

$= 24 + \frac{1}{2}(8\pi) = 16 + 4\pi \approx$ 36.56 cm

12.56

11. Find the area of this shape. Use $\pi \approx 3.14$.



1 whole circle (4 fourths)

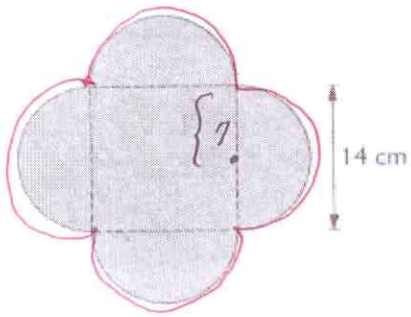
$A = \pi r^2$

$= \pi(7^2) = 49\pi$

$\approx 49(3,14)$

$\approx$ 153,86 cm²

12. This table mat is made up of a square and 4 semicircles. Find the area and the perimeter. Use $\pi \approx \frac{22}{7}$



Square + 2 Circles

$A = (14\times14) + 2(\pi(7^2))$

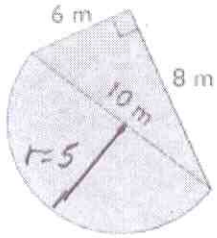
$= 196 + 98\pi$

$\approx 196 + \frac{98}{1} \cdot \frac{22}{7} \approx 196 + 308 \approx$ 504 cm²

P = 2 Circumf

$= 2 \cdot (14\pi) = 28\pi \approx 28 \cdot \frac{22}{7} \approx$ 88 cm

13. This figure is made up of a triangle and a semicircle. Find its area and perimeter. Use $\pi \approx 3.14$.



A = Triangle + Semi Circle

$= \frac{1}{2}(6\cdot8) + \frac{1}{2}(\pi \cdot (5^2))$

$= \frac{1}{2}(48) + 12,5\pi$

$\approx 24 + 39,25 \approx$ 63,25 m²

P = 6+8 + ½ Circumf

$= 14 + \frac{1}{2}(16\pi)$

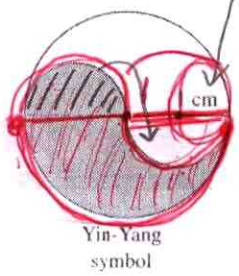
$= 14 + 5\pi$

$\approx 14 + 15,7$

$\approx$ 29,7 m

$\frac{1}{2}$ of radius of Big Circle

14. Find the area and perimeter of the shaded region. Leave answer in terms of π.



A of SemiCircle $= \frac{1}{2}\pi(2^2) = \boxed{2\pi \text{ cm}^2}$

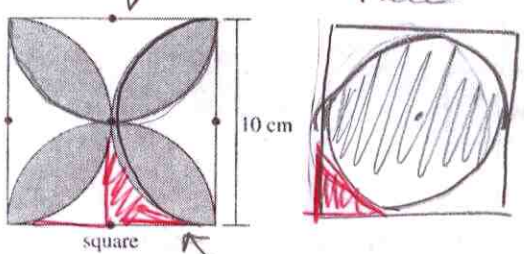
$P = \frac{1}{2}$ Big Circle Circum + All small circle Circumf ($d = 2$)

$= \frac{1}{2}[\pi \cdot 4] + 2\pi \cdot 1$ (4 = diameter)

$= 2\pi + 2\pi$

$= \boxed{4\pi \text{ cm}}$

15. Find the area and perimeter of the shaded region. Leave answers in terms of π.



So is 1 whole circle with $r = 5$

$A = \pi r^2$

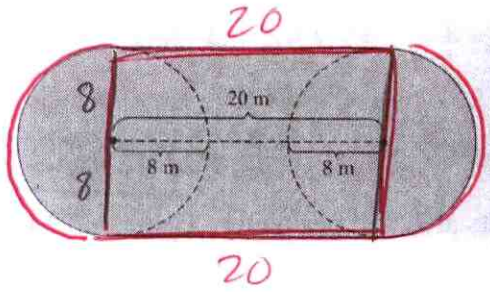
$= 5^2 \cdot \pi$

$= \boxed{25\pi \text{ sq. cm}}$

$P =$ 2 Crrcumf of Circle $r = 5$

$= 2\pi r = 2\pi \cdot 5 = \boxed{10\pi \text{ cm}}$

16. Find the area of the shaded region. Use $\pi \approx 3.14$



rectangle + circle

$A = (20 \times 16) + \pi(8^2)$

$= 320 + 64\pi$

$\approx 320 + 200.96$

$\approx \boxed{520.96 \text{ m}^2}$