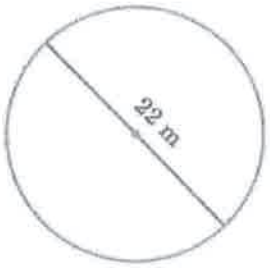
Geometry ♣H

Name : Key

WHITE QUESTIONS **[1 POINT EACH]**

1. Find the circumference of the circle.

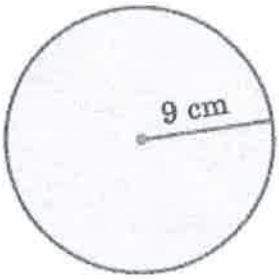


$C = \pi d$

$C = \pi(22)$

$C \approx 69.1\text{ m}$

2. Find the area of the circle.



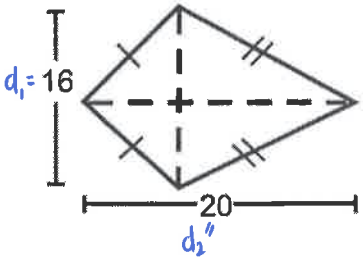
$A = \pi r^2$

$A = \pi(9)^2$

$A = 81\pi$

$A \approx 254.5\text{ cm}^2$

3. Find the area of the kite.

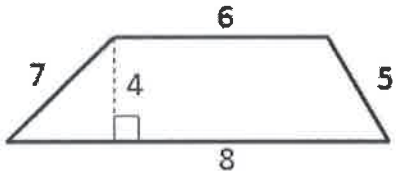


$A = \frac{1}{2}d_1d_2$

$= \frac{1}{2}(16)(20)$

$= 160\text{ units}^2$

4. Find the area of the trapezoid.



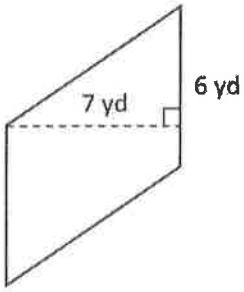
$A = \frac{1}{2}h(b_1+b_2)$

$= \frac{1}{2}(4)(6+8)$

$= \frac{1}{2}(4)(14)$

$= 28\text{ units}^2$

5. Find the area of the parallelogram.

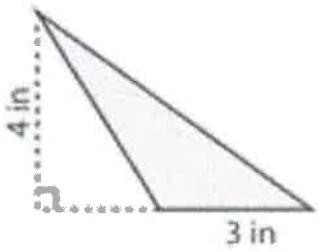


$A = bh$

$= (6)(7)$

$= 42\text{yd}^2$

6. Find the area of the triangle.

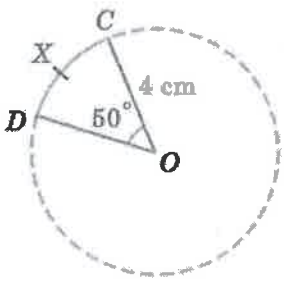


$A = \frac{1}{2}bh$

$= \frac{1}{2}(3)(4)$

$= 6\text{in}^2$

7. Find the length of $\overset{\frown}{CXD}$



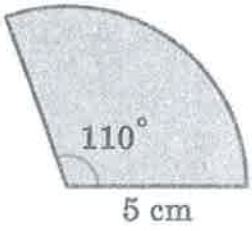
$\frac{\overset{\frown}{CXD}}{2\pi(4)} = \frac{50}{360}$

$\frac{\overset{\frown}{CXD}}{8\pi} = \frac{50}{360}$

$\frac{360\overset{\frown}{CXD}}{360} = \frac{400\pi}{360}$

$\overset{\frown}{CXD} = 3.5\text{ cm}$

8. Find the area of the sector.



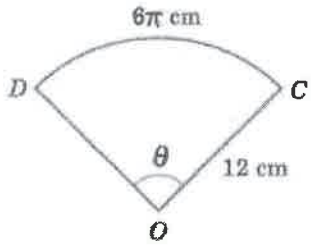
$\frac{A}{\pi(5)^2} = \frac{110}{360}$

$\frac{A}{25\pi} = \frac{110}{360}$

$\frac{360A}{360} = \frac{2750\pi}{360}$

$A = 24\text{cm}^2$

9. Find the $m\overset{\frown}{DC}$.



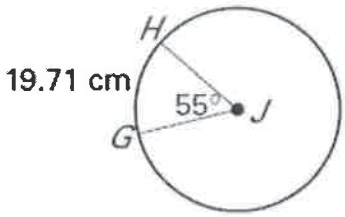
$\frac{6\pi}{2\pi(12)} = \frac{\theta}{360}$

$\frac{6\pi}{24\pi} = \frac{\theta}{360}$

$\frac{6}{24} = \frac{\theta}{360} \Rightarrow 24\theta = 2160$

$\theta = 90°$

10. Find the radius of $\odot C$.



$\frac{19.71}{2\pi r} = \frac{55}{360}$

$\frac{7095.6}{110\pi} = \frac{110\pi r}{110\pi}$

$r = 20.5\text{cm}$

BLUE QUESTIONS **[2 POINTS EACH]**

11. Find the area of a circle whose circumference is 34π inches. Round to the nearest tenth.

$C = 2\pi r$

$\frac{34\pi}{2\pi} = \frac{2\pi r}{2\pi}$

$r = \frac{34}{2} = 17\text{in}$

$A = \pi r^2$

$A = \pi(17)^2$

$A = 289\pi$

$A = 907.9\text{in}^2$

12. How far will a wheel of radius 9 cm travel in two revolutions? Round your answer to the nearest centimeter.

$C = 2\pi r$

$C = 2\pi(9)$

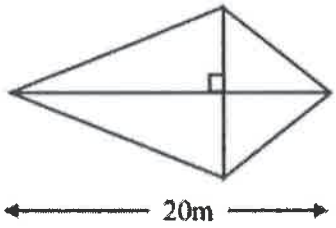
$C = 18\pi$

$C = 56.5\text{cm}$

$\times 2$ revolutions

$= 113\text{cm}$

13. Find the diagonal if the area is 85 m^2.



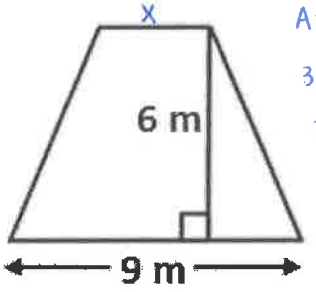
$A = \frac{1}{2}d_1 d_2$

$85 = \frac{1}{2}(20)(y)$

$85 = 10y$

$y = 8.5$

14. Find the missing base if the area is 36 m^2.



$A = \frac{1}{2}h(b_1 + b_2)$

$36 = \frac{1}{2}(6)(x+9)$

$36 = 3(x+9)$

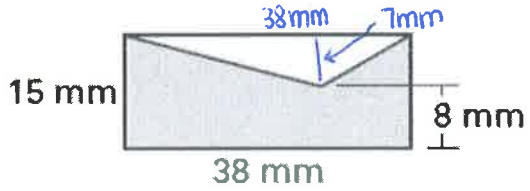
$36 = 3x + 27$

$9 = 3x$

$x = 3$

base = 3m

15. Find the area of the shaded portion of the figure.



Area $\square = (15)(38)$

$= 570\text{mm}^2$

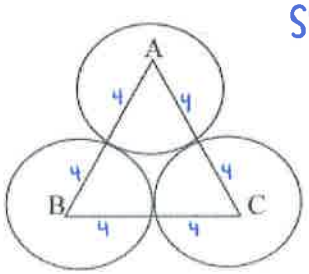
$A\,\Delta = \frac{1}{2}(38)(7)$

$= 133\text{mm}^2$

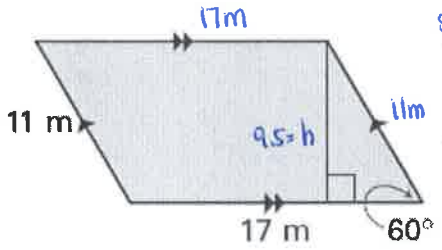
Total shaded $= 570 - 133 = 437\text{mm}^2$

16. If AB=BC=AC=8, find the total area.

SKIP



17. Find the area of the parallelogram.



$\frac{\sin 60}{1} = \frac{h}{11}$

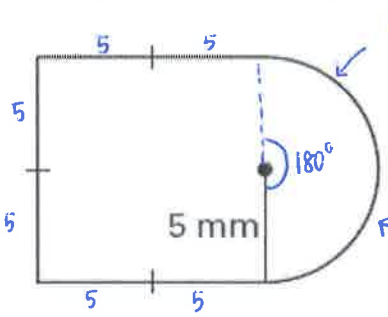
$h = 11\sin 60$

$h = 9.5$

$A = bh$

$= (17)(9.5) = \boxed{161.5\,m^2}$

18. Find the perimeter of the region.



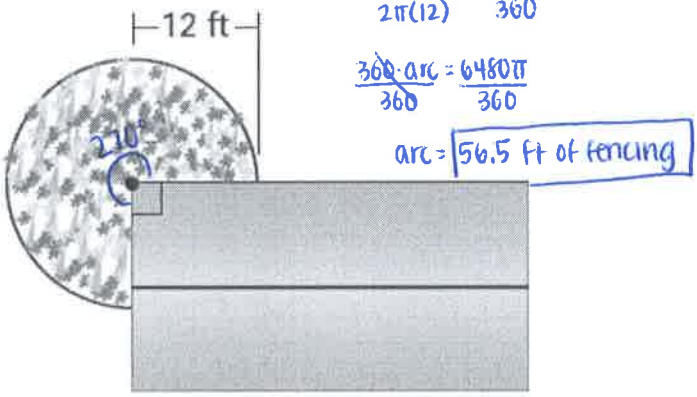
$\frac{\text{arc length}}{2\pi(5)} = \frac{180}{360}$

$\frac{360 \cdot arc}{360} = \frac{1800\pi}{360}$

arc = 15.7

Perimeter = $15.7 + 10 + 10 + 10 = \boxed{45.7\,mm}$

19. You have planted a circular garden adjacent to one of the corners of your garage, as shown. You want to fence in your garden. About how much fencing do you need?

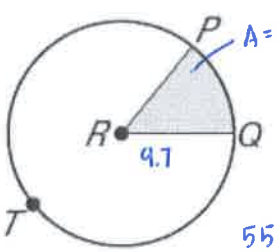


$\frac{\text{arc length}}{2\pi(12)} = \frac{270}{360}$

$\frac{360 \cdot arc}{360} = \frac{6480\pi}{360}$

arc = $\boxed{56.5\text{ ft of fencing}}$

20. The area of circle R is 295.52 in^2. The area of sector PRQ is 55 in^2. Find the radius of circle R and find $\overset{\frown}{mPQ}$.



Area $= \pi r^2$

$\frac{295.52}{\pi} = \frac{\pi r^2}{\pi}$

$94.1 = r^2$

$r = 9.7$

$\frac{55}{\pi(9.7)^2} = \frac{\overset{\frown}{mPQ}}{360}$

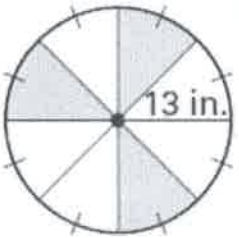
$\frac{55}{94.09\pi} = \frac{\overset{\frown}{mPQ}}{360}$

$\frac{19800}{94.09\pi} = \frac{94.09\pi \cdot \overset{\frown}{mPQ}}{94.09\pi}$

$\overset{\frown}{mPQ} = \boxed{61°}$

GOLD PROBLEMS **[3 POINTS EACH]**

21. Find the total area of the shaded sectors.



360 ÷ 8 = 45°

$\frac{Area}{\pi(13)^2} = \frac{45}{360}$

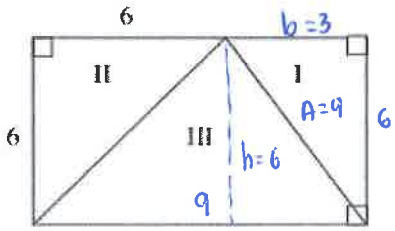
$\frac{Area}{169\pi} = \frac{45}{360}$

$\frac{360 \cdot Area}{360} = \frac{7605\pi}{360}$

Area = $66.4\,in^2$

Three shaded sectors = $66.4 \times 3 = \boxed{199.2\,in^2}$

22. Given Area (II) = 2 Area (1), please find Area III.



$A_{(II)} = \frac{1}{2}(6)(6) = 18\text{ units}^2$

$A_{(I)} = \frac{1}{2}(18) = 9$

$Area_{(I)} = \frac{1}{2}bh$

$9 = \frac{1}{2}b(6)$

$9 = 3b$

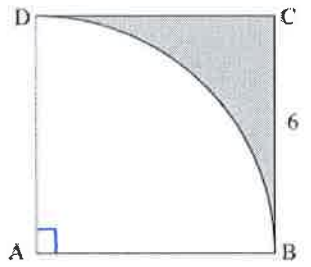
$b = 3$

Area (III) $= \frac{1}{2}bh$

$= \frac{1}{2}(9)(6)$

$= \boxed{27\text{ units}^2}$

24. Given square DCBA and circle A, what is the area of the shaded region?



Area □ = $(6)^2 = 36$ units^2

$\frac{\text{Area sector}}{\pi(6)^2} = \frac{90}{360}$

$\frac{\text{Area}}{36\pi} = \frac{90}{360}$

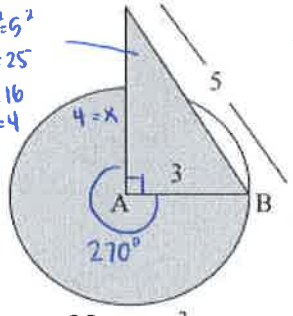
$\frac{360 \cdot \text{Area}}{360} = \frac{3240\pi}{360}$

Area = 28.3 units^2

shaded = $36 - 28.3$

= 7.7 units^2

25. Given $\odot A$, AB = 3 and $m\angle A = 90°$, find the area of the shaded region.



$x^2 + 3^2 = 5^2$

$x^2 + 9 = 25$

$x^2 = 16$

$x = 4$

$\frac{\text{Area}}{\pi(3)^2} = \frac{270}{360} \Rightarrow \frac{A}{9\pi} = \frac{270}{360}$

$\frac{360A}{360} = \frac{2430\pi}{360}$

$A = 21.2$

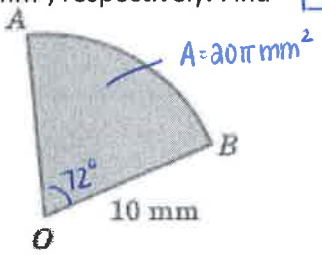
$A = \frac{1}{2}(3)(4)$

$A = 6$

total = 21.2 + 6

= 27.2 units

26. In the figure, the radius and the area of the sector *OAB* are 10 mm and 20π mm^2, respectively. Find the length of $\overset{\frown}{AB}$ to the nearest tenth.



$A = 20\pi$ mm^2

$\frac{20\pi}{\pi(10)^2} = \frac{m\overset{\frown}{AB}}{360}$

$\frac{20}{100} = \frac{m\overset{\frown}{AB}}{360}$

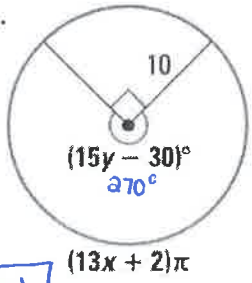
$100 \cdot m\overset{\frown}{AB} = 7200 \Rightarrow m\overset{\frown}{AB} = 72°$

$\frac{\overset{\frown}{AB}}{2\pi(10)} = \frac{72}{360}$

$\frac{\overset{\frown}{AB}}{20\pi} = \frac{72}{360}$

$\frac{360 \cdot \overset{\frown}{AB}}{360} = \frac{1440\pi}{360} \Rightarrow \overset{\frown}{AB} = 12.6$ mm

27. Find the values of x and y.



$15y - 30 = 270$

$15y = 300$

$y = 20$

$\frac{(13x+2)\pi}{2\pi(10)} = \frac{270}{360}$

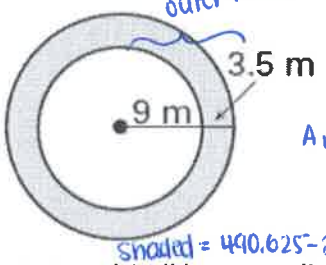
$\frac{13x+2}{20} = \frac{270}{360}$

$5400 = 360(13x+2)$

$5400 = 4680x + 720$

$4680 = 4680x \Rightarrow x = 1$

28. Find the area of the shaded portion of the figure.



outer r = 12.5

$A_{outer} = \pi(12.5)^2$

$= 156.25\pi$

≈ 490.625

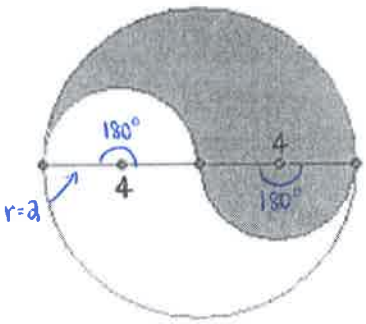
$A_{inner} = \pi(9)^2$

$= 81\pi$

≈ 254.34

shaded = $490.625 - 254.34$ = 236.3 m^2

29. Find the area of the shaded portion of the figure.

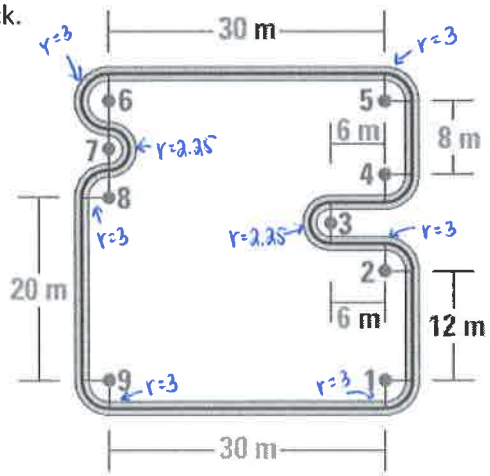


$A = \frac{1}{2}\pi(4)^2$

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

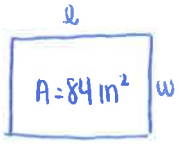
$A = 8\pi \approx$ 25.1 units^2

30. Turns 1, 2, 4, 5, 8, and 9 all have a radius of 3 meters. Turns 3 and 7 each have a radius of 2.25 meters. Calculate the length of the track.



Work on next page

31. The area of a rectangle is 84 square inches. The length of the rectangle is 2 inches longer than twice the width. Find the width and the perimeter of the rectangle.



$l = 2 + 2w$

$A = bh$

$84 = (w)(2 + 2w)$

$84 = 2w + 2w^2$

$0 = 2w^2 + 2w - 84$

$0 = w^2 + w - 42$

$0 = (w+7)(w-6)$

$w \neq -7$, $w = 6$

width = 6 in

length = 14 in

(#30) Turn 1, 2, 4, 5, 8, 9 : radius = 3 and arc measure = 90°

$$\frac{\text{arc length}}{2\pi(3)} = \frac{90}{360}$$

$$\frac{\text{arc length}}{6\pi} = \frac{90}{360}$$

$$\frac{360 \cdot \text{arc length}}{360} = \frac{540\pi}{360}$$

arc length = 4.7m

Turn 3 and 7: radius = 2.25 and arc measure = 180°

$$\frac{\text{arc length}}{2\pi(2.25)} = \frac{180}{360}$$

$$\frac{\text{arc length}}{4.5\pi} = \frac{180}{360}$$

$$\frac{360 \cdot \text{arc length}}{360} = \frac{810\pi}{360}$$

arc length = 7.1m

Turn 6: radius = 3 and arc measure = 180°

$$\frac{\text{arc length}}{2\pi(3)} = \frac{180}{360}$$

$$\frac{\text{arc length}}{6\pi} = \frac{180}{360}$$

$$\frac{360 \cdot \text{arc length}}{360} = \frac{1080\pi}{360}$$

arc length = 9.4m

Length of track = 163.8 m