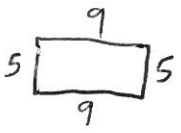
Unit 11 Review

For 1-3, find the measure of each dimension.

1. A rectangle has a perimeter of 28 inches and a width of 5 inches. What is the length of the rectangle? 9



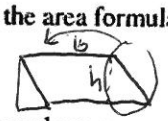
2. A triangle has an area of 12 square centimeters and a height of 12 centimeters. What is the base of the triangle? 2

$12 = \frac{12h}{2}$

3. A rectangle has an area of 84 square feet and a width of 7 feet. What is the length of the rectangle? 12

$84 = 7x$

4. **ABSTRACT REASONING** How is the area formula for a parallelogram derived from the area formula for a rectangle?



5. Convert each of the following angle measures from degrees to radians.

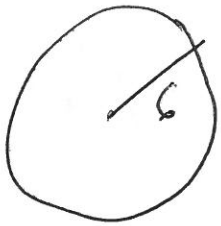
Degrees	Radians	Degrees	Radians
0	0	180	π
30	$\pi/6$	210	$7\pi/6$
45	$\pi/4$	225	$5\pi/4$
60	$\pi/3$	240	$4\pi/3$
90	$\pi/2$	270	$3\pi/2$
120	$2\pi/3$	300	$\frac{5\pi}{3}$
135	$3\pi/4$	315	$\frac{7\pi}{4}$
150	$5\pi/6$	330	$\frac{11\pi}{6}$

$\times \frac{\pi}{180}$

6. Convert each radian measure to degrees.

Radians	Degrees	Radians	Degrees
$\frac{5\pi}{12}$	$\frac{5(180)}{12} = 5 \times 15 = 105^\circ$	3	$\frac{3 \cdot 180}{\pi} \approx 172^\circ$
$\frac{\pi}{10}$	$\frac{180}{10} = 18^\circ$	$\frac{5\pi}{3}$	$\frac{5(180)}{3} = 5 \cdot 60 = 300^\circ$
$\frac{13\pi}{6}$	$\frac{13(180)}{6} = 13 \cdot 30 = 390^\circ$	π	180°

7. A circle has radius 6. A) Find the exact circumference, B) find the circumference as a decimal, C) find the length of the arc subtended by a central angle of 120 degrees, D) find the area of the circle, F) find the area of the sector described in C.



A) 12π

B) 37.7

C) $\frac{120}{360} \cdot 12\pi = 4\pi$ u

D) 36π

E) $\frac{120^\circ}{360} \cdot 36\pi = 12\pi$ u^2

8. A circle has circumference 24π. A) Find the diameter and radius, B) find the circumference as a decimal, C) find the length of the arc subtended by a central angle of 210 degrees in terms of pi, D) find the area of the circle in terms of pi, E) find the area of the sector described in C as a decimal.

$C = 24\pi$

$\frac{24\pi}{\pi} = \frac{D\pi}{\pi}$

$24 = D$

A) $D = 24$

$R = 12$

B) 75.4

C) $24\pi\left(\frac{210}{360}\right)$

$24\pi\left(\frac{7}{12}\right)$

14π

D) 144π

E) $144\pi\left(\frac{210}{360}\right)$

$144\pi\left(\frac{7}{12}\right)$

84π

9. A circle has an area 144π. A) Find the diameter and radius, B) find the exact circumference, C) find the length of the arc subtended by a central angle of 90 degrees as a decimal, E) find the area of the sector described in C as a decimal.

$\frac{144\pi}{\pi} = \frac{\pi r^2}{\pi}$

$144 = r^2$

$12 = r$

A) $D = 24$

$R = 12$

B) 24π

C) $\frac{90}{360}(24\pi) = 6\pi$

E) $\frac{90}{360}\,144\pi$

36π

10. A circle has circumference 50.24. A) Find the diameter and radius, B) find the circumference ~~as a decimal~~ exact, C) find the length of the arc subtended by a central angle of 70 degrees in terms of pi, D) find the area of the circle in terms of pi, E) find the area of the sector described in C as a decimal.

$\frac{50.24}{\pi} = \frac{D\pi}{\pi}$

$16 = D$

A) $D = 16$

$R = 8$

B) 16π

C) $16\pi\left(\frac{70}{360}\right)$

$\frac{28\pi}{9}$

D) 256π

$\frac{70}{360} \cdot 256\pi = \frac{1792\pi}{36}$

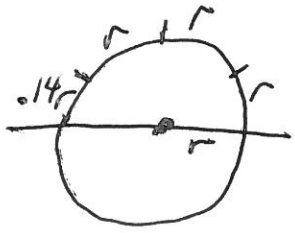
$\frac{4 \cdot 4 \cdot 4 \cdot 4 \cdot 7}{2 \cdot 3 \cdot 2 \cdot 3}$

11. Describe in words an angle in radians.

How many radii that can fit in the arc in between the sides of an angle when a circle is constructed centered at the vertex of the angle.

12. Explain why π radians is equal to 180 degrees.

Because about 3.14 radii will fit around a semi circle.



$\theta = \frac{s}{r}$ (x)

13. Given two of the following, find the third. S is arc length, r is radius, x is an angle in radians.

a. s = 10, r = 3, x = ?

$\theta = \frac{10}{3}$

$\theta = 3.\overline{3}$

b. s = ?, r = 7, x = 1.5

$1.5 = \frac{s}{7}$

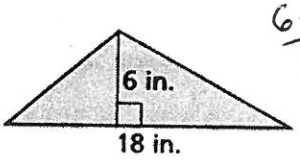
$s = 10.5$

c. s = 3, r = ? , x = 1/4

$\frac{1}{4} = \frac{3}{r}$

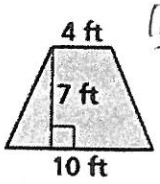
$r = 12$

14. **Find the area of the figure.**



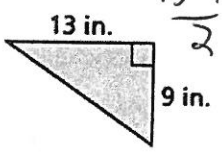
$\frac{6 \cdot 18}{2}$

$54\ in^2$



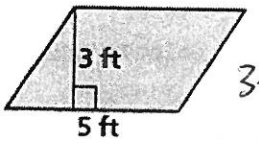
$\frac{(10+4)7}{2}$

$49\ ft^2$



$\frac{13 \cdot 9}{2}$

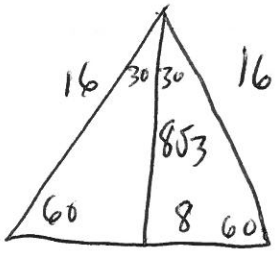
$58.5\ in^2$



3.5

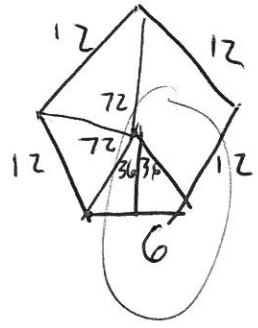
15

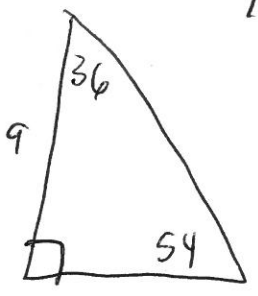
15. Find the exact area of an equilateral triangle with perimeter 48.



$\frac{16 \cdot 8\sqrt{3}}{2} = 64\sqrt{3}\ u^2$

16. Find the area of a regular pentagon with side length 12 rounded to the nearest tenth.





$Tan\,54 = \frac{9}{6}$

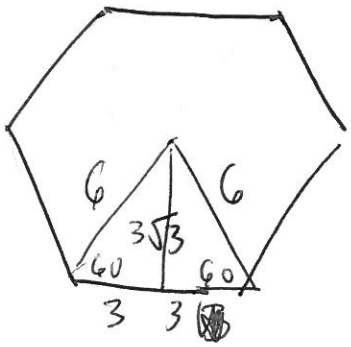
$8.26 = 9$

$A_T = 49.5$

$A_P = 49.5 \times 5$

$247.7\ u^2$

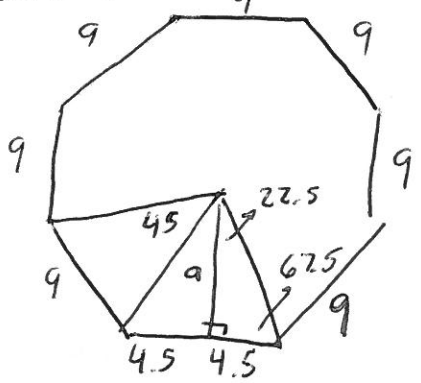
17. Find the exact area of a regular hexagon with radius length 6.



$\frac{6 \cdot 3\sqrt{3}}{2} \times 6$

$54\sqrt{3}\ u^2$

18. Find the area of an octagon with perimeter 72 to the nearest tenth.

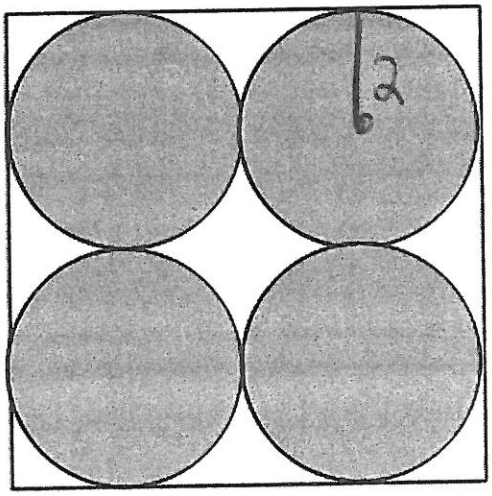


$\tan 67.5 = \frac{9}{4.5}$

$a = 10.9$

$\frac{9(10.9)}{2} \times 8 = 391.1$

19. Find the area of the region in between the circles inside the square given the area of the square is 64 cm^2 and the circles are externally tangent.



$A = \sqrt{s^2} = \sqrt{64}$

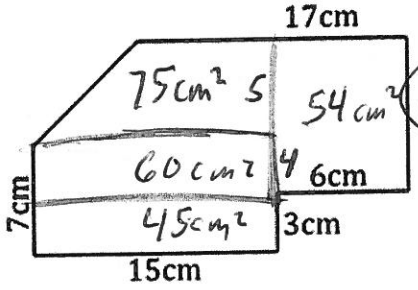
$s = 8$

$64 - 4\pi 2^2$

$64 - 16\pi$

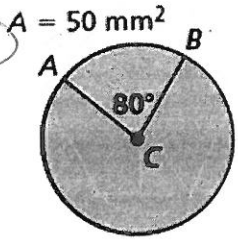
20. Find the area of each figure.

a.



234 cm²

b. Find the area of ⊙C.

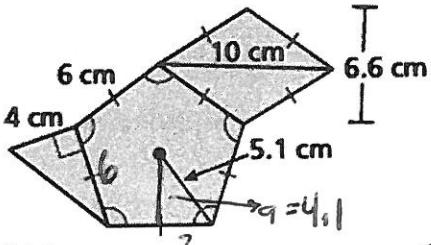


$\frac{80}{360} A = 50$

$A = 50\left(\frac{360}{80}\right)$

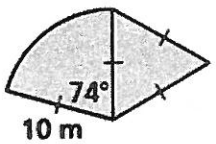
225 cm²

c.



$\frac{4(6)}{2} + \frac{6(4.1)}{2}.5 + \frac{6.6(10)}{2} = 106.5 \text{ cm}^2$

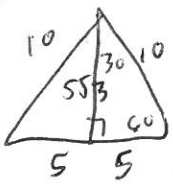
d.



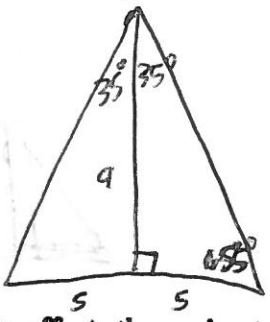
$\frac{74}{360} 100\pi + \frac{10(553)}{2}$

$64.5 + 43.3$

107.8 m²



21. Find the area of an isosceles triangle with vertex angle measure 70 degrees and base length 10.



$\tan 55 = \frac{9}{5}$

$7.1 = 9$

$A = \frac{7.1(10)}{2}$ ≈ 35.5

22. **Describe how the change affects the perimeter and the area of the rectangle.**

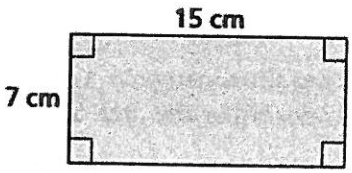
multiplying the width by 3 P [illegible], A ×3

increases by 72/28

multiplying the length by $\frac{1}{5}$ and the width by 4

Perimeter increases by 62/44

Area decreases by 4/5



23. A triangle has area 300 ft^2 and perimeter 200ft. Each dimension is changed by multiplying it by some number k. The new area is 75 ft^2. What is the new perimeter?

$300 \times k^2 = 75$

$\sqrt{k^2} = \sqrt{\frac{75}{300}} = \sqrt{\frac{1}{4}} = \frac{1}{2}$

$200 \times \frac{1}{2} =$ 100 ft

24. A rhombus has area 24 cm^2 and perimeter 16 cm. Each dimension is changed by multiplying it by some number k. The new perimeter is 48 cm. What is the new area?

$16 \times k = 48$

$k = 3$

$24 \times 3^2 =$ 216 cm^2

25. **About 6200 people live in one-fourth of a region with a 5-mile radius. What is the most reasonable estimate for the population density in people per square mile?** ***(TEKS G.12.C)***

$A = 25\pi \cdot \frac{1}{4}$

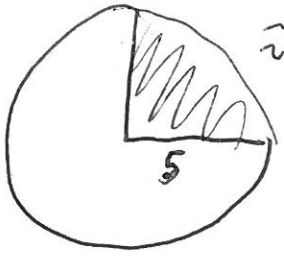
≈ 19.625

Ⓐ **80 people per square mile**

Ⓑ **250 people per square mile**

Ⓒ **315 people per square mile**

Ⓓ **425 people per square mile**



$\frac{6200}{19.625} \approx 315$ ppsm

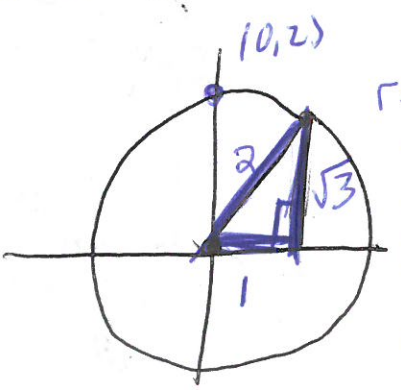
26. The point $(1, \sqrt{3})$ lies on the circle centered at the origin and containing which point? *(TEKS G.12.E)*

Ⓕ (3, 4)

Ⓖ (4, 0)

Ⓗ (0, 2)

Ⓙ (5, 3)



Pythagorean Theorem to find

27. All the linear dimensions of a rectangle are multiplied by $\frac{1}{4}$. Which of the following statements describes the area of the new rectangle? *(TEKS G.10.B)*

Ⓐ The area of the new rectangle is $\frac{1}{64}$ times the area of the original rectangle.

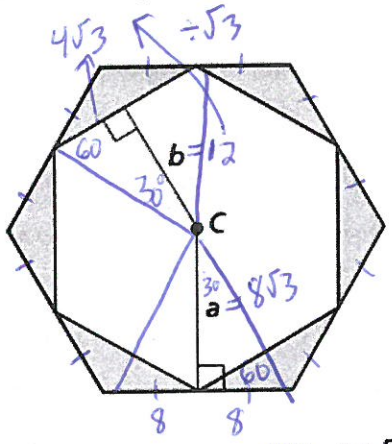
Ⓑ The area of the new rectangle is $\frac{1}{16}$ times the area of the original rectangle.

Ⓒ The area of the new rectangle is $\frac{1}{8}$ times the area of the original rectangle.

Ⓓ The area of the new rectangle is $\frac{1}{4}$ times the area of the original rectangle.

$\left(\frac{1}{4}\right)^2$

28. The figure shows two regular hexagons with center C and apothems a and b. Each vertex of the smaller hexagon is a midpoint of a side of the larger hexagon. What is the total area of the shaded regions when $a = 8\sqrt{3}$ centimeters and $b = 12$ centimeters? *(TEKS G.11.A)*



$\frac{16(8\sqrt{3})}{2} \cdot 6 - \frac{8\sqrt{3}(12)}{2} \cdot 6$

$384\sqrt{3} - 288\sqrt{3}$

$96\sqrt{3}$

Ⓕ $24\sqrt{3}$ cm^2

Ⓖ $96\sqrt{3}$ cm^2

Ⓗ $288\sqrt{3}$ cm^2

Ⓙ $672\sqrt{3}$ cm^2