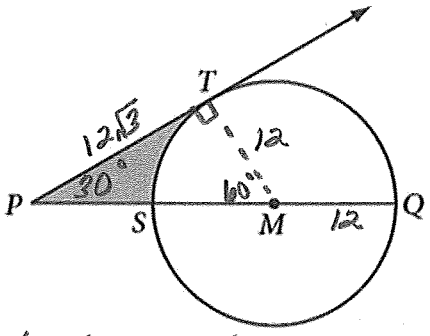
Name Key

Unit 8 Practice Test
Circles

Part A – Circles & the Pythagorean Theorem

1. Find the area of the shaded region.
Tangent $\overrightarrow{PT}, QM = 12, m\angle P = 30°$



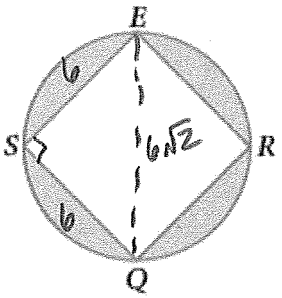
$A_{triangle}: \frac{(12)(12\sqrt{3})}{2}$ $A_{sector}: \frac{60}{360} \cdot 144\pi$

$72\sqrt{3}$ $\frac{1}{6} \cdot 144\pi = 24\pi$

$A = 72\sqrt{3} - 24\pi$ units^2

2. Find the area of the shaded region.
SQRE is a square and *SQ* = 6m.

$r = 3\sqrt{2}$



$A_{circle}: \pi(3\sqrt{2})^2$ $A_{square}: (6)(6)$

18π 36

$A = 18\pi - 36\ m^2$

Part B – Equations of Circles

3. The equation of a circle is $4x^2 + 4y^2 - 16x + 24y - 36 = 0$. Identify the center and radius of the circle. Show your work to justify your answer.

$x^2 - 4x + y^2 + 6y - 9 = 0$

$x^2 - 4x + y^2 + 6y = 9$

$(x^2 - 4x + 4) + (y^2 + 6y + 9) = 9 + 4 + 9$

$(x-2)^2 + (y+3)^2 = 22$

center: $(2, -3)$ radius: $\sqrt{22}$

4. Write the equation of a circle in standard form whose diameter has endpoints (4, -1) and (-6, 7). Rewrite the equation in general form. Show all of your work!

center: $\frac{4+-6}{2}, \frac{-1+7}{2}$

$(-1, 3)$

radius: $d = \sqrt{(4-(-1))^2 + (-1-3)^2}$

$= \sqrt{(5)^2 + (-4)^2}$

$= \sqrt{25+16}$

$= \sqrt{41}$

Standard Form: $(x+1)^2 + (y-3)^2 = 41$

General Form:

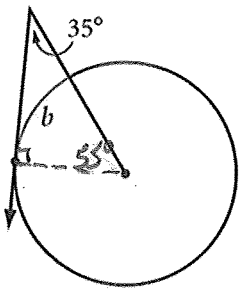
$(x+1)(x+1) + (y-3)(y-3) = 41$

$x^2 + 2x + 1 + y^2 - 6y + 9 = 41$

$x^2 + 2x + y^2 - 6y - 31 = 0$

Part C – Solving For Parts of a Circle

5. $b =$ 55°

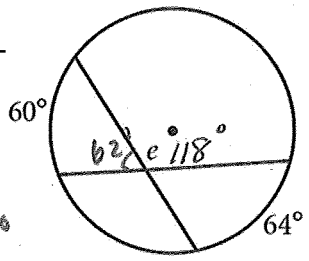


6. $e =$ 118°

$\frac{1}{2}(60+64)$

62°

$\angle 2 = 180° - 62°$

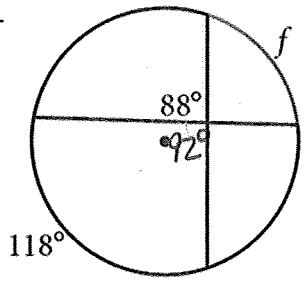


7. $f =$ 66°

$\frac{1}{2}(118+f) = 92°$

$118 + f = 184$

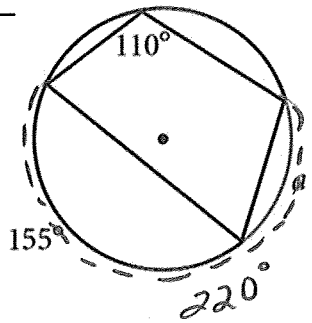
$f = 66$



8. $a =$ 65°

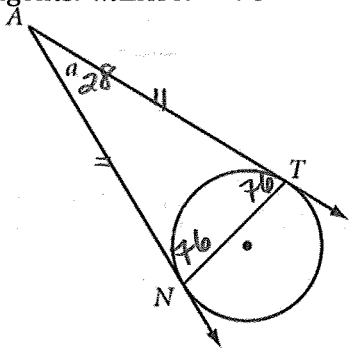
$220 - 155$

65°



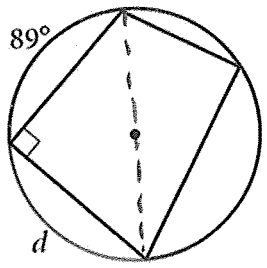
9. $\overleftrightarrow{AT}$ and $\overleftrightarrow{AN}$ are tangents. $m\angle ATN = 76°$

$a =$ 28°



10. $d =$ 91°

$180 - 89 = 91$

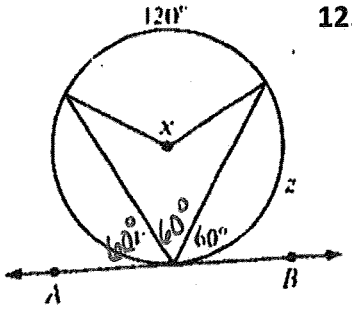


11. $\overleftrightarrow{AB}$ is a tangent.

$x =$ 120°

$y =$ 60°

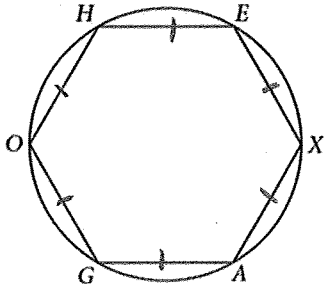
$z =$ 120°



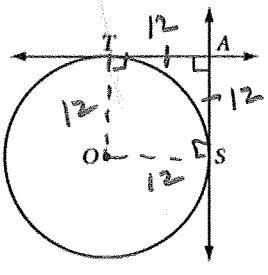
12. HEXAGO is a regular hexagon inscribed in a circle.

$m\overset{\frown}{OH} =$ 60°

$\frac{360}{6} = 60°$



13. $\overleftrightarrow{AT}$ and $\overleftrightarrow{AS}$ are tangents. $AT = 12$ cm. What is the circumference of circle O?



$C = 24\pi$

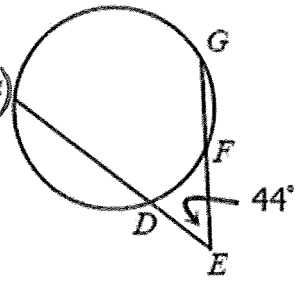
14. $\boxed{m\overset{\frown}{DF} = 72°}$

160°

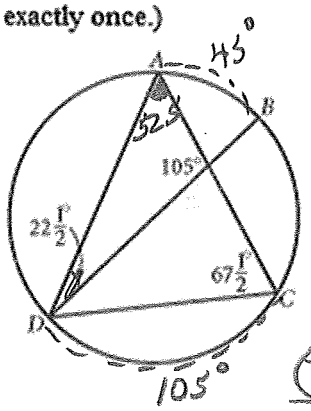
$44 = \frac{1}{2}(160 - DE)$

$88 = 160 - DF$

$72 = DF$



15. What is the probability that a flea strolling along the circle shown below will stop randomly on either $\overset{\frown}{AB}$ or $\overset{\frown}{CD}$? (Because you're probably not an expert in flea behavior, assume the flea will stop exactly once.)



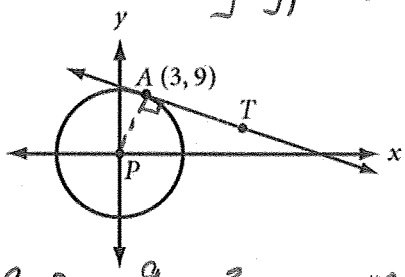
$\frac{45+105}{360}$

$\frac{150}{360}$

$\frac{5}{12}$ or 41.67%

16. $\overleftrightarrow{AT}$ is tangent to circle P. Find the equation of $\overleftrightarrow{AT}$.

$y-y_1=m(x-x_1)$



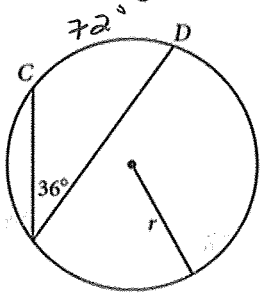
$m=\frac{9-0}{3-0}=\frac{9}{3}=\frac{3}{1}$ $\therefore$ $m=-\frac{1}{3}$

$y-9=-\frac{1}{3}(x-3)$

$y-9=-\frac{1}{3}x+1$ $\quad y=-\frac{1}{3}x+10$

17. $r=25cm$

The exact arc length of $\overset{\frown}{CD}$ = 10π cm



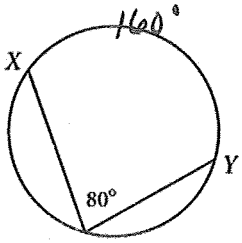
$\frac{72°}{360}\cdot 50\pi$

$\frac{1}{5}\cdot 50\pi$

10π

18. The length of $\overset{\frown}{XY}$ is 14π.

Diameter = $63/2$



$14\pi=\frac{160}{360}\cdot\pi d$

$14=\frac{4}{9}d$

$\frac{9}{4}\cdot 14=\frac{4}{9}d\cdot\frac{9}{4}$

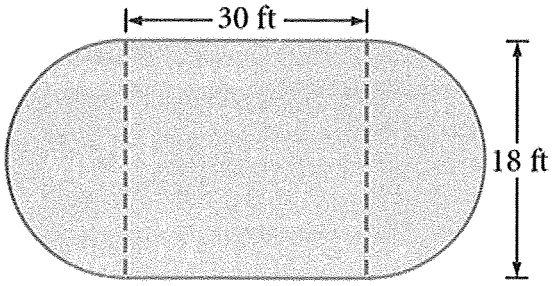
$\frac{63}{2}=d$

19. Pool contractor Peter Tileson needs to determine the number of 1-inch tiles to put around the edge of a pool. The pool is a rectangle with two semicircular ends as shown. How many tiles will be needed?

$D=18\pi+2(30)$

~ 116.55 ft.

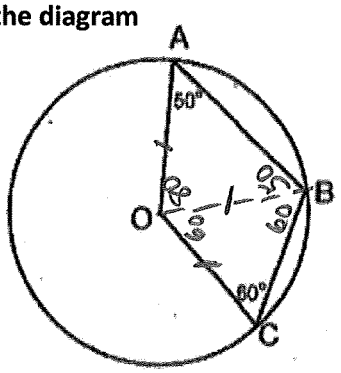
$116.55\text{ft}\cdot\frac{12"}{1\text{ft}}\sim 1399$ tiles



20. Points A, B and C lie on the circumference of the circle centered at O. If $m\angle OAB = 50°$ and $m\angle BCO = 60°$, what is the measure of $\angle AOC$? **Hint: You will need to draw something in on the diagram**

$m\angle AOC=80+60$

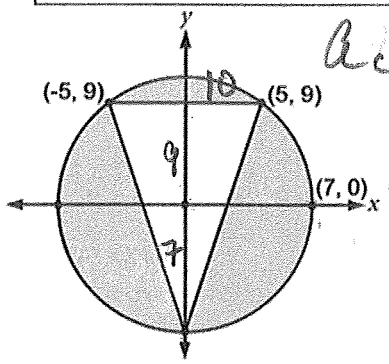
$=140°$



Part D – Areas of Shaded Regions

21. Find the area of the shaded region.

AREA = $49\pi - 80$ units^2



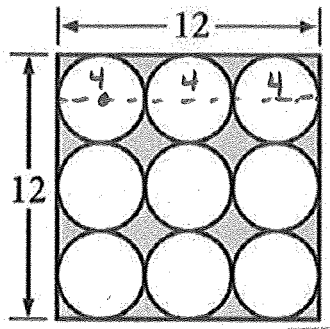
$a_{circle}: \pi(7)^2$

49π

$a_{triangle}: \frac{(10)(16)}{2}$

80

22. Find the shaded area.



$r = 2$

$a_{square}: (12)(12)$

144

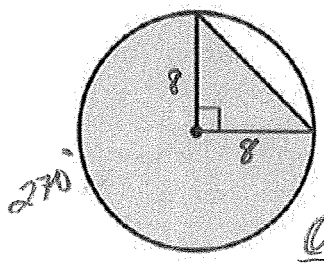
$a_{circles}: \pi(2)^2 \cdot 9$

36π

$a = 144 - 36\pi$ units^2

23. Find the area of the shaded region.

$r = 8$ cm



$a_{sector}: \frac{270}{360} \cdot 64\pi$

$\frac{3}{4} 64\pi$

48π

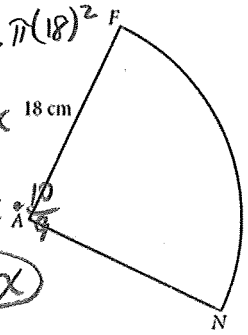
$a_{triangle}: \frac{(8)(8)}{2} = 32$

$a = 48\pi + 32$ cm^2

24. The area of the sector is 108π cm^2.

$m\angle FAN =$ 120°

(The diagram is not drawn to scale)



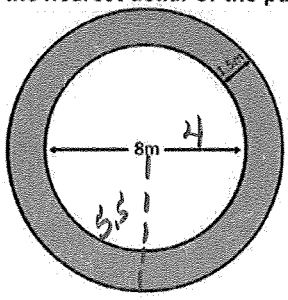
$108\pi = \frac{x^\circ}{360} \cdot \pi(18)^2$

$108 = \frac{324}{360} x$

$\frac{10}{9} \cdot 108 = \frac{9}{10} x \cdot \frac{10}{9}$

$120^\circ = x$

25. Utopia Park has just installed a circular fountain 8 meters in diameter. The Park Committee wants to pave a 1.5-meter-wide path around the fountain. If paving costs \$10 per square meter, find the cost to the nearest dollar of the paved path around the fountain.



$a = (5.5^2\pi - 4^2\pi)$

$\sim (30.25\pi - 16\pi)$

$\sim 14.25\pi$

$\sim 44.77 m^2$

44.77

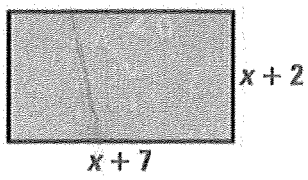
$\times 10$

$\sim \$448$

Part E – Solving Equations

26. Set up an equation and **solve by factoring**.

Area of rectangle = 84



$(x+2)(x+7) = 84$

$x^2 + 9x + 14 = 84$

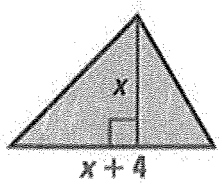
$x^2 + 9x - 70 = 0$

$(x+14)(x-5) = 0$

$x = -14$ $x = 5$

27. Set up an equation and **solve by completing the square.**

Area of triangle = 40 $\frac{(x+4)x}{2} = 40$



$x^2 + 4x = 80$

$x^2 + 4x + 4 = 80 + 4$

$(x+2)(x+2) = 84$

$(x+2)^2 = 84$

$\sqrt{84}$

$2\sqrt{21}$

$x + 2 = \pm\sqrt{84}$

$x = -2 \pm 2\sqrt{21}$