Name ______________________ Geometry Final Exam Study Guide Unit 6: Circles

Circle: A circle is the set of all points in a plane that are a given distance, the radius, from a given point, the center.

Diameter: twice the length of the radius

All circles are similar: take the formula $C = \pi d$, solve for π. $\pi = \frac{C}{d}$ for <u>every</u> circle. OR....take $C = 2\pi r$, and $\pi = \frac{C}{2r}$ for <u>every</u> circle.

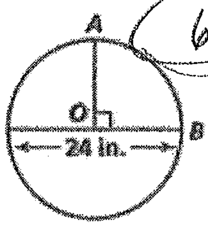
Arc length: $\frac{arc\ measure}{360} \cdot 2\pi r$ **Sector Area:** $\frac{arc\ measure}{360} \cdot \pi r^2$

Find the length of each arc. Leave your answers in terms of π

1. $\overset{\frown}{AB}$

$\frac{90}{360} \cdot 24\pi$

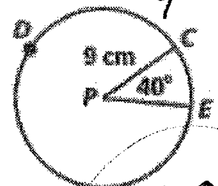
6π



2. $\overset{\frown}{CDE}$

$\frac{320}{360} \cdot 2\pi \cdot 9$

$\frac{8}{9} \cdot 18\pi$

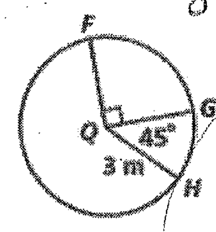


16π

3. $\overset{\frown}{FH}$

$\frac{135}{360} \cdot 2\pi \cdot 3$

$\frac{3}{8} \cdot 6\pi$

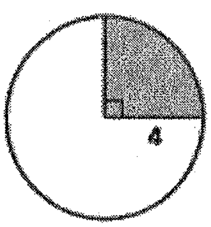


$\frac{9}{4}\pi$

2.25π

Find the area of each shaded sector. Leave your answers in terms of π

4.

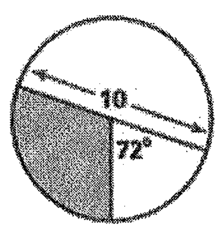


$\frac{90}{360} \cdot \pi r^2$

$\frac{1}{4} \cdot 16\pi$

4π

5.



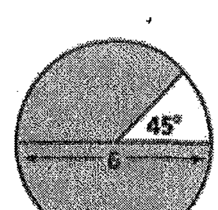
$\frac{108}{360} \pi (5)^2$

$\frac{3}{10} \cdot 25\pi$

7.5π

$\frac{15}{2}\pi$

6.



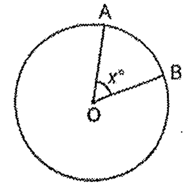
$\frac{315}{360} \pi (3)^2$

$\frac{7}{8} \cdot 9\pi$

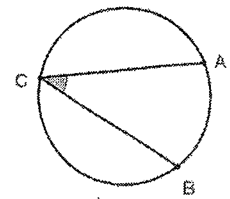
$\frac{63}{8}\pi$

7.875π

Central Angle: vertex is in the <u>center</u> of the circle. Central angle = intercepted arc measure.

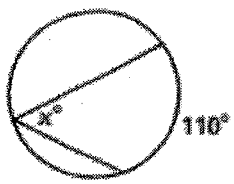


Inscribed Angle: vertex is on the circle. Inscribed angle = $\frac{1}{2}$ intercepted arc measure.



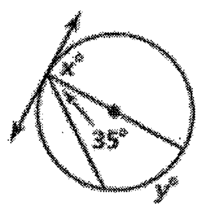
*If a quadrilateral is inscribed in a circle, then opposite angles are supplementary.

7.



x = 55

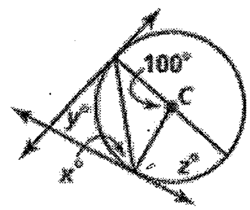
8.



x = 90

y = 70

9.

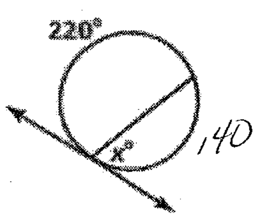


x = 50

y (arc) = 100

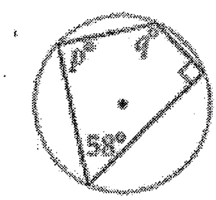
z = 80

10.



x = 70

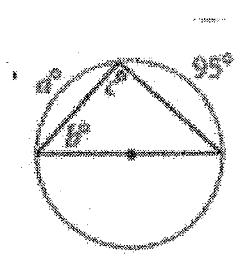
11.



p = 90

q = 122

12.

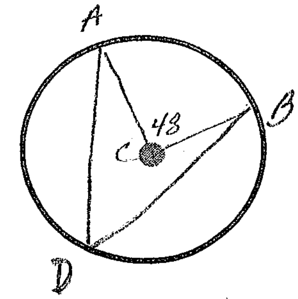


a = 85

b = 47.5

c = 90

13. To the right is circle C.



a. label the center C.

b. draw central angle ACB. Label its measure 48°

c. place point D on the circle (not in it!!!!) draw inscribed angle ADB.

d. What is the measure of arc AB? 48

e. What is the measure of angle ADB? 24

Standard form of a circle: $(x - h)^2 + (y - k)^2 = r^2$

Center = (h, k)   radius = r

Identify the center and the radius:

14. $(x + 3)^2 + y^2 = 16$

Center $(-3, 0)$

Radius 4

15. $(x - 9)^2 + (y + 5)^2 = 64$

center $(9, -5)$

radius 8

16. $x^2 + y^2 = 3$

center $(0, 0)$

radius $\sqrt{3}$

Write the standard form equation for each circle:

17. center (-5, 8) radius = 16

$(x+5)^2 + (y-8)^2 = 256$

18. Center (2, -9) radius = $\sqrt{5}$

$(x-2)^2 + (y+9)^2 = 5$

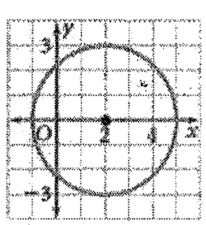
19. center (0, 0) radius = $2\sqrt{5}$

$x^2 + y^2 = 20$

20. Center (-10, -8) radius = $3\sqrt{2}$

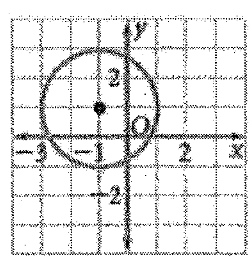
$(x+10)^2 + (y+8)^2 = 18$

21.



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

22.



$(x+1)^2 + (y-1)^2 = 4$

Calculate the radius and then write the standard form equation of the circle:

23. center (-2, 5) point (2, 3)

Radius ________

Equation $(x+2)^2+(y-5)^2=$ ________

24. Center (3, 5) point (2, 11)

radius ________

Equation $(x-3)^2+(y-5)^2=$ ________

Is the point inside the circle, on the circle, or outside the circle?

25. center (-3, 8) radius = 3 point: (0, 8)

$(x+3)^2+(y-8)^2=9$

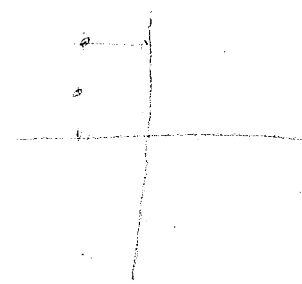
$9+0=9$ ON

26. center (-3, 8) radius = 3 point: (-3, 4)

$(x+3)^2+(y-8)^2=9$

$0+16>9$

OUT



27. center (-3, 8) radius = 3 point: (-4, 6)

$(x+3)^2+(y-8)^2=9$

1^2+2^2 IN

$1+4$

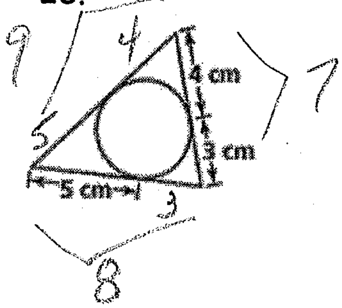
$5<9$

Tangent Lines: a line is tangent to a circle if it intersects the circle in exactly one point.

- The tangent line and the radius are perpendicular
- If two tangent lines meet at a point outside the circle, they are congruent.

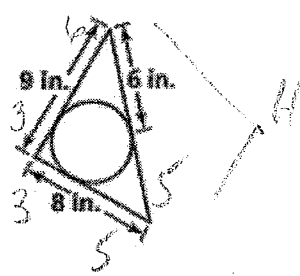
Find the perimeter:

28.



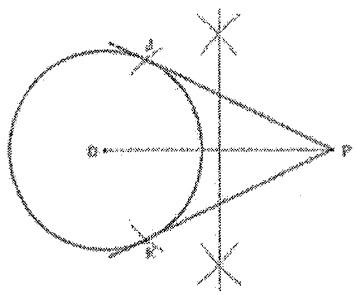
24 cm

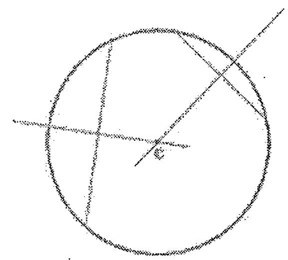
29.

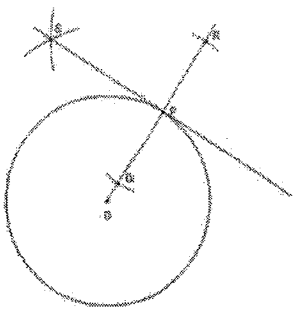


28 in

Tangent line constructions: circle the two figures which model constructiong a tangent line:







Steps for constructing a tangent line from a circle to a point outside the circle. Also visit mathopenref.com for more help.

1. Draw circle O, draw point P outside O.

2. connect points P and O.

3. find the midpoint of this line by constructing the perpendicular bisector.

4. place compass on the midpoint, and set the width to point O.

5. with compass on midpoint draw two arcs that intersect the circle at two points. Call these points J and K.

6. Connect P and J, and P and K.

Steps for constructing a tangent line from a circle to a point on the circle.

1. Draw circle O, with point P on the circle

2. connect O and P, and extend the line beyond P.

3. place compass on P and make arcs on the left and right of P. Call the points Q and R.

4. widen compass. Compass on Q, make an arc above P.

5. compass on R, make an arc above P.

6. Call the intersection of the arcs S. Connect P and S.