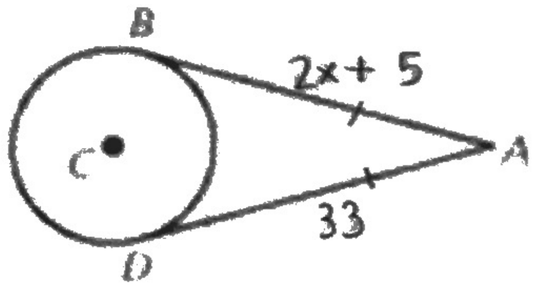
Name: Key Date: Band:
Geometry

Unit 9: Circles Practice Problems

9.1 Lines and Segments That Intersect Circles

1. In the diagram, $\overline{AB}$ is tangent to $\odot C$ at B and $\overline{AD}$ is tangent to $\odot C$ at D. Find the value of x.



$2x+5=33$

$2x=28$

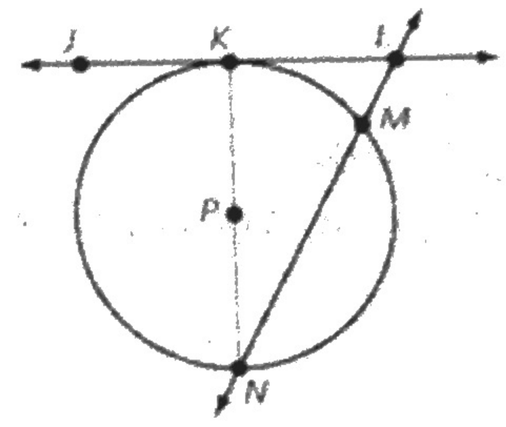
$\boxed{x=14}$

2. Tell whether the line, ray, or segment is best described as a *radius*, *chord*, *diameter*, *secant*, or *tangent* of $\odot P$.

A. $\overline{PK}$ radius

B. $\overline{NM}$ chord

C. $\overleftrightarrow{JL}$ tangent



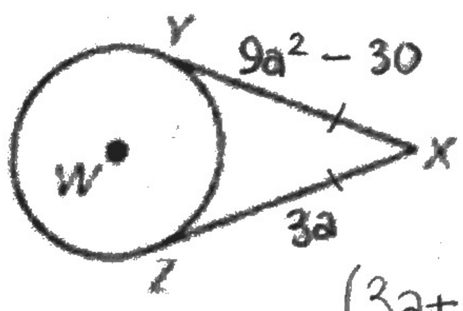
D. $\overline{KN}$ diameter

E. $\overleftrightarrow{NL}$ secant

F. $\overline{PN}$ radius

3. Points Y and Z are points of tangency. Find the value of the variable. ★ need to know how to factor to solve

★A.



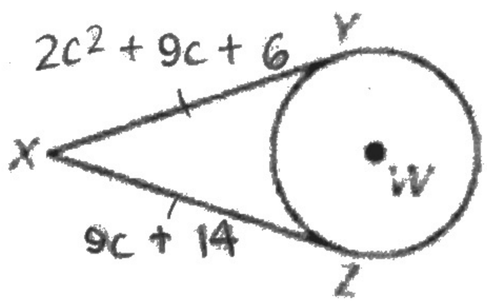
$(3a+5)(a-2)=0$

$9a^2-30=3a$ $3a+5=0$ $a-2=0$

$9a^2-3a-30=0$ $3a=-5$ $\boxed{a=2}$

$3a^2-a-10=0$ $a=\frac{-5}{3}$

B.



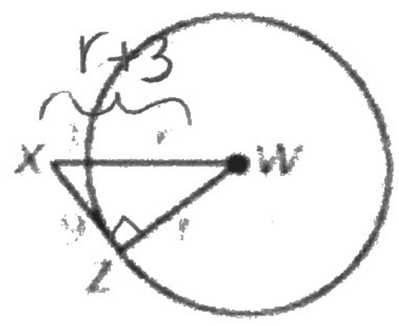
$2c^2+9c+6=9c+14$

$2c^2=8$ $\boxed{c=2}$

$c^2=4$

$c=\pm 2$

C.



$9^2+r^2=(r+3)^2$

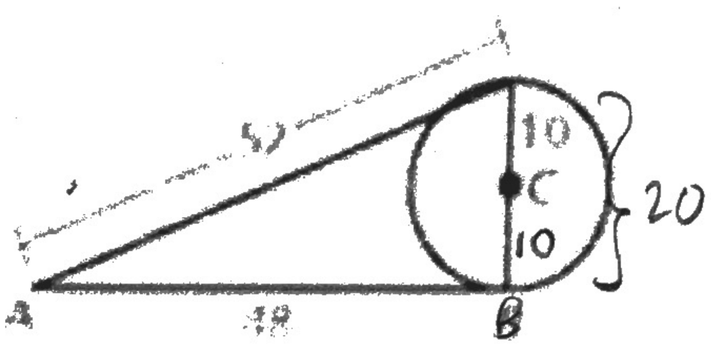
$81+r^2=r^2+6r+9$

$81=6r+9$

$72=6r$

$\boxed{r=12}$

4. Tell whether $\overline{AB}$ is tangent to $\odot C$. Explain.



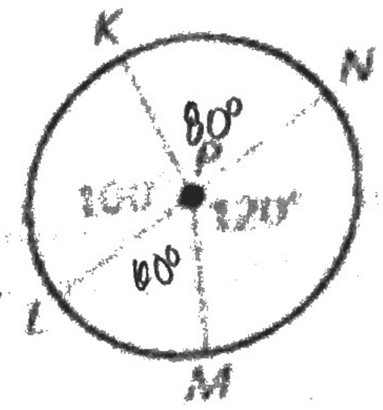
$20^2+48^2 \stackrel{?}{=} 52^2$

$2704=2704$ ✓

$\overline{AB}$ is tangent to $\odot C$ because $\overline{AB} \perp \overline{BC}$.

9.2 Finding Arc Measures

5. Find the measure of each arc of $\odot P$, where $\overline{LN}$ is a diameter.



A. $\overset{\frown}{MN}$

120°

B. $\overset{\frown}{NLM}$

240°

C. $\overset{\frown}{NML}$

180°

D. $\overset{\frown}{KL}$

100°

E. $\overset{\frown}{LM}$

60°

F. $\overset{\frown}{KM}$

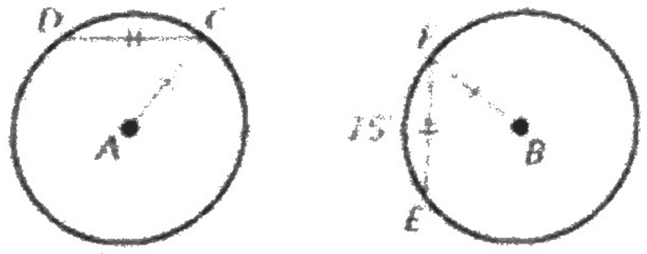
160°

G. $\overset{\frown}{KN}$

80°

9.3 Using Chords

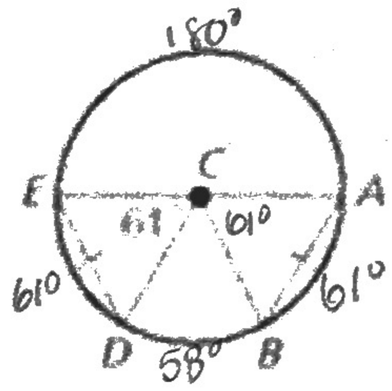
6. In the diagram, $\odot A \cong \odot B, \overline{CD} \cong \overline{FE}$, and $m\overset{\frown}{FE} = 75°$. Find $m\overset{\frown}{CD}$.



$m\overset{\frown}{CD} = 75°$

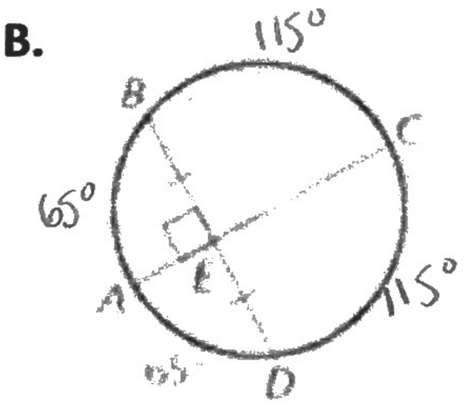
7. Find the measure of $\overset{\frown}{AB}$.

A.



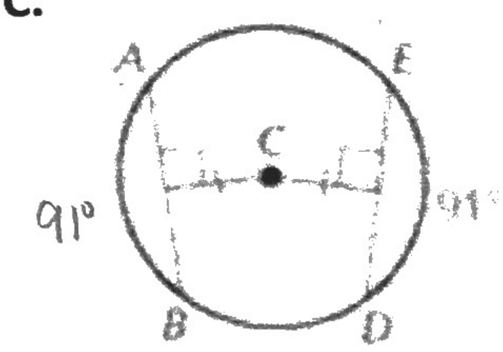
$m\overset{\frown}{AB} = 61°$

B.



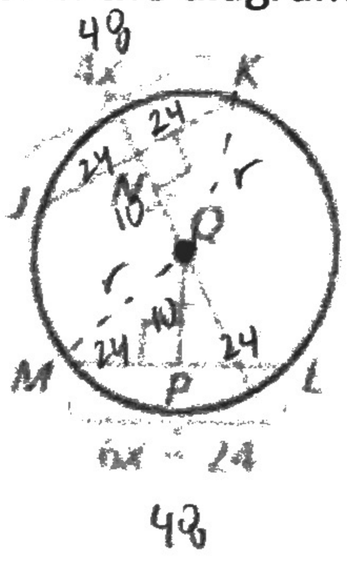
$m\overset{\frown}{AB} = 65°$

C.



$m\overset{\frown}{AB} = 91°$

8. In the diagram, $QN = QP = 10, JK = 4x$, and $LM = 6x - 24$. Find the radius of $\odot Q$.



$4x = 6x - 24$

$-2x = -24$

$x = 12$

$r^2 = 10^2 + 24^2$

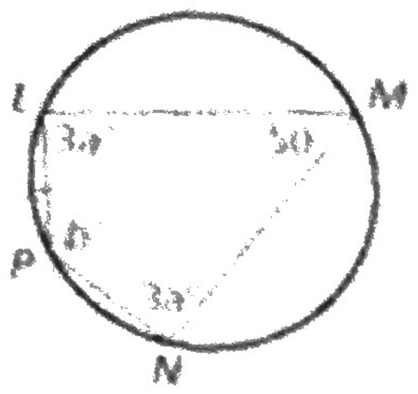
$r^2 = 676$

$\boxed{r = 26}$

9.4 Inscribed Angles and Polygons

9. Find the value(s) of the variable(s). inscribed angle = $\frac{1}{2}$ intercepted arc

A.



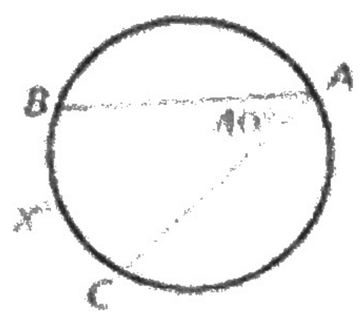
$m\angle LMN = 50° \rightarrow m\overset{\frown}{LN} = 100°$

$m\overset{\frown}{LMN} = 260° \rightarrow \boxed{b = 130°}$

$3a + 3a + 130 + 50 = 360$

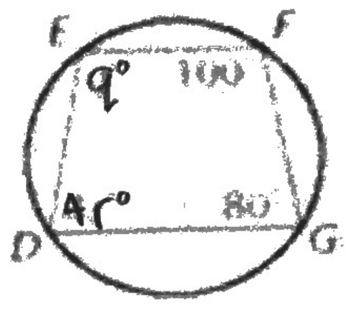
$9a = 180 \rightarrow \boxed{a = 20°}$

B.



$\boxed{x = 80°}$

C.



opp. $\angle$'s supp.

$q° + 80° = 180°$

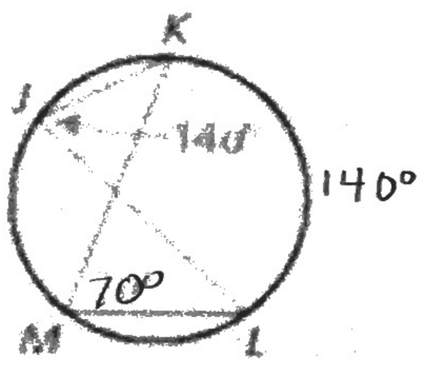
$\boxed{q = 100°}$

$4r° + 100° = 180°$

$4r = 80$

$\boxed{r = 20°}$

D.

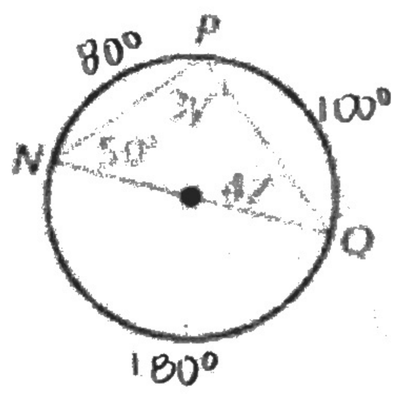


$14d° = \frac{1}{2}140°$

$14d° = 70°$

$\boxed{d = 5°}$

E.



$3y° = \frac{1}{2}180°$

$3y = 90$

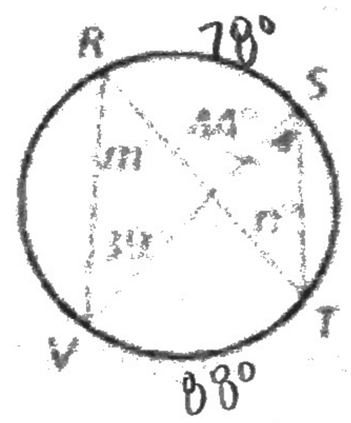
$\boxed{y = 30°}$

$4z° = \frac{1}{2}80°$

$4z = 40$

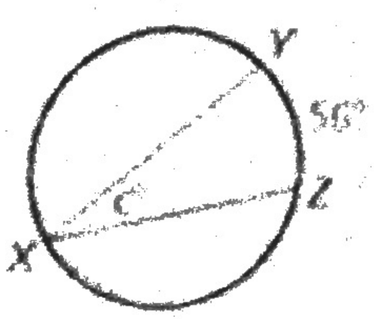
$\boxed{z = 10°}$

F.



$\boxed{m = 44°}$ $\boxed{n = 39°}$

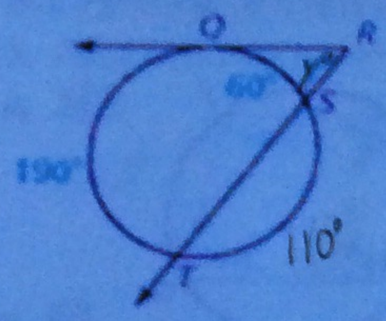
G.



$\boxed{C = 28°}$

9.5 Angle Relationships in Circles

10. Find the value of y.



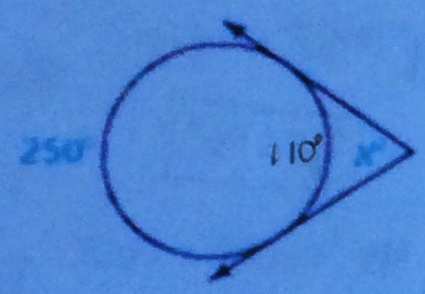
$y = \frac{1}{2}(190° - 60°)$

$y = \frac{1}{2}(130°)$

$\boxed{y = 65°}$

11. Find the value of x.

A.

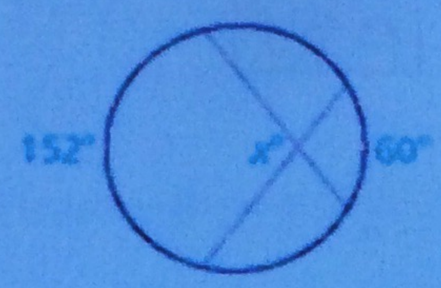


$x = \frac{1}{2}(250° - 110°)$

$x = \frac{1}{2}(140°)$

$\boxed{x = 70°}$

B.

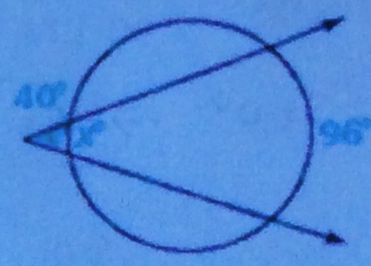


$x = \frac{1}{2}(152° + 60°)$

$x = \frac{1}{2}(212°)$

$\boxed{x = 106°}$

C.



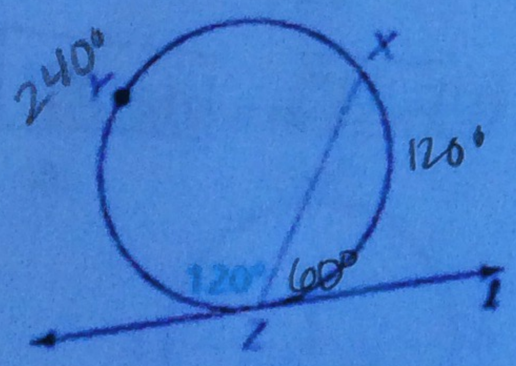
$40° = \frac{1}{2}(96° - x°)$

$80° = 96° - x°$

$-16° = -x°$

$\boxed{x = 16°}$

12. Line l is tangent to the circle. Find $m\overset{\frown}{XYZ}$.



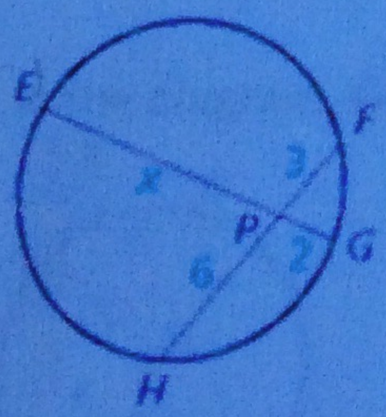
$m\overset{\frown}{XYZ} = 240°$

9.6 Segment Relationships in Circles

need to know what to refer to solve

13. Find the value of x.

A.

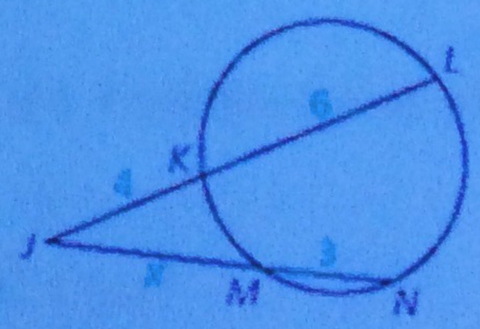


$2 \cdot x = 6 \cdot 3$

$2x = 18$

$\boxed{x = 9}$

B.



$4(4+6) = x(x+3)$

$4(10) = x^2 + 3x$

$40 = x^2 + 3x$

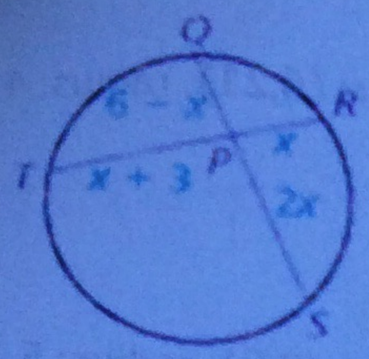
$x^2 + 3x - 40 = 0$

$(x+8)(x-5) = 0$

$x + 8 = 0 \qquad x - 5 = 0$

$x = -8 \qquad \boxed{x = 5}$

C.



$x^2 - 3x = 0$

$x(x-3) = 0$

$x = 0$ $\quad x - 3 = 0$

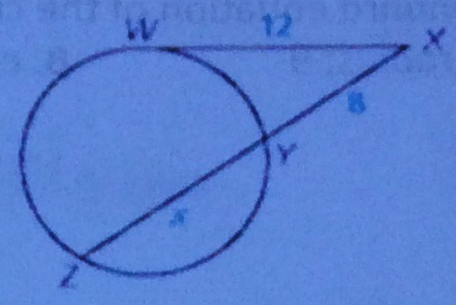
$x = 3$

$x(x+3) = 2x(6-x)$

$x^2 + 3x = 12x - 2x^2$

$3x^2 - 9x = 0$

D.



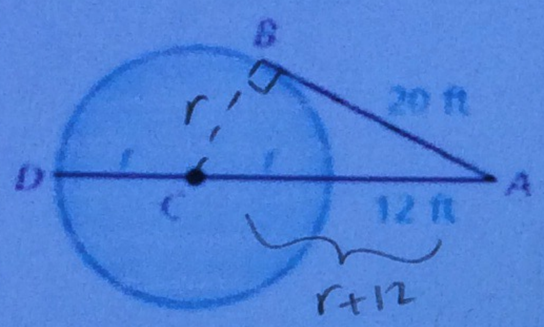
$12^2 = 8(8+x)$

$144 = 64 + 8x$

$80 = 8x$

$10 = x$

14. A local park has a circular ice skating rink. You are standing at point A, about 12 feet from the edge of the rink. The distance from you to a point of tangency on the rink is about 20 feet. Estimate the radius of the rink.



Method 1

$r^2 + 20^2 = (r+12)^2$

$r^2 + 400 = r^2 + 24r + 144$

$400 = 24r + 144$

$256 = 24r$

$16\frac{2}{3}\text{ ft} = r$

Method 2

$20^2 = 12(12+2r)$

$400 = 144 + 24r$

$256 = 24r$

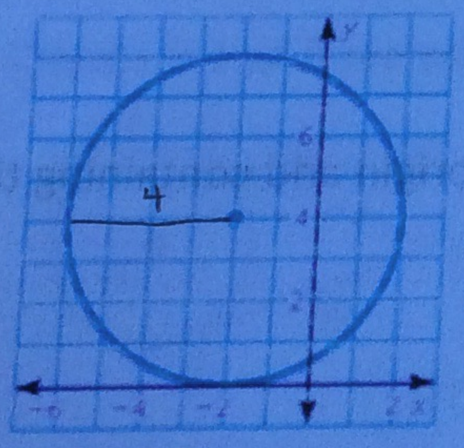
$16\frac{2}{3}\text{ ft} = r$

9.7 Circles in the Coordinate Plane

15. Write the standard equation of the circle shown.

$(x-x_1)^2 + (y-y_1)^2 = r^2$

A.

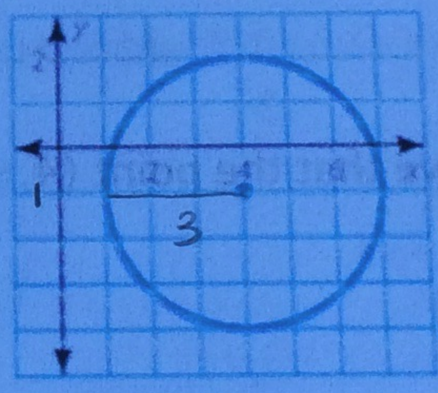


center: $(-2, 4)$

radius = 4

$(x+2)^2 + (y-4)^2 = 16$

B.

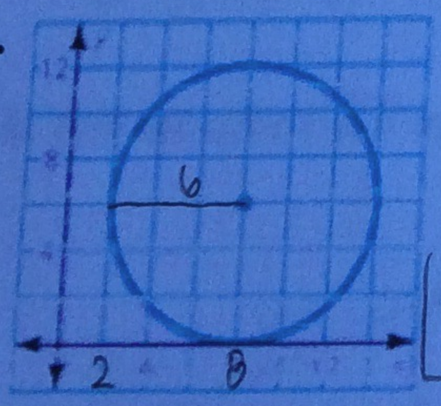


center: $(4, -1)$

radius = 3

$(x-4)^2 + (y+1)^2 = 9$

C.

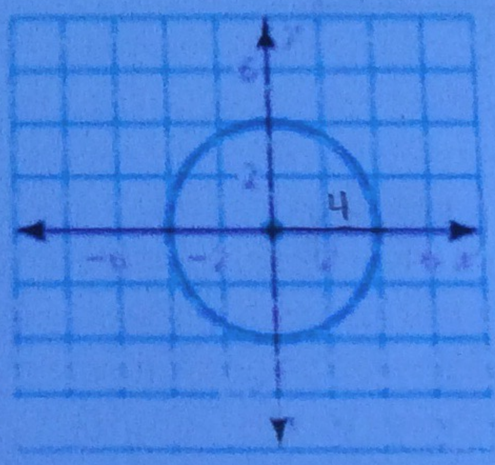


center: $(8, 6)$

radius = 6

$(x-8)^2 + (y-6)^2 = 36$

D.



center: $(0, 0)$

radius = 4

$(x-0)^2 + (y-0)^2 = 16$

or

$x^2 + y^2 = 16$

16. Write the standard equation of the circle with the given center and radius.

A. center: (0,0), radius: 9

$x^2+y^2=81$

B. center: (−5,2), radius: 1.3

$(x+5)^2+(y-2)^2=1.69$

C. center: (6,21), radius: 4

$(x-6)^2+(y-21)^2=16$

D. center: (−3,2), radius: 16

$(x+3)^2+(y-2)^2=256$

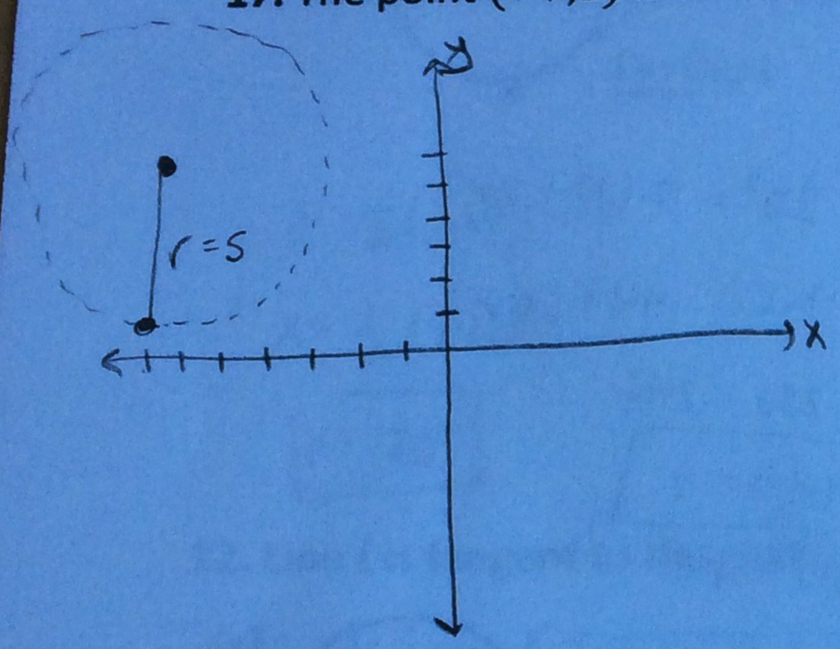
E. center: (10,7), radius: 3.5

$(x-10)^2+(y-7)^2=12.25$

F. center: (0,0), radius: 5.2

$x^2+y^2=27.04$

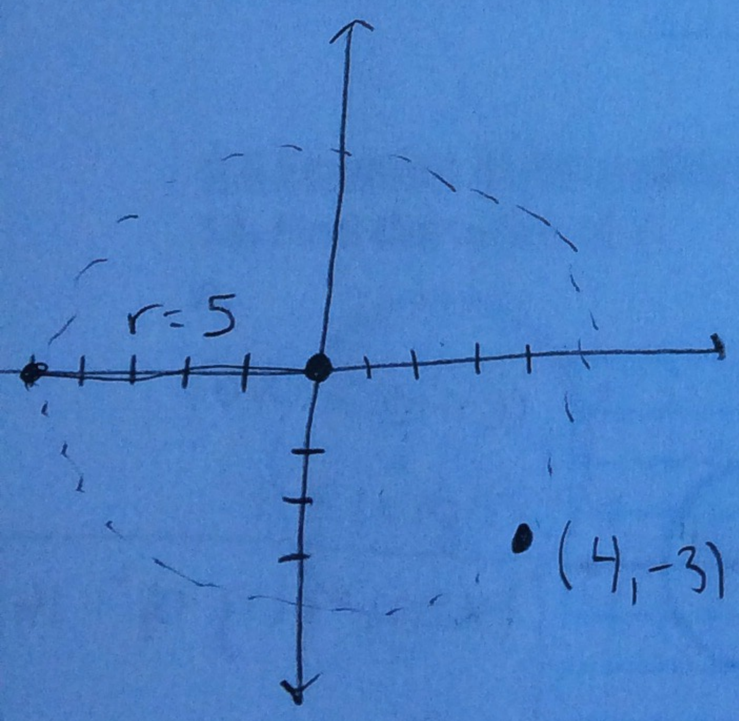
17. The point (−7,1) is on a circle with center (−7,6). Write the standard equation of the circle.



$(x+7)^2+(y-6)^2=5^2$

$\boxed{(x+7)^2+(y-6)^2=25}$

18. Prove or disprove that the point (4, −3) lies on the circle centered at the origin and containing the point (−5,0).



$x^2+y^2=5^2$

$x^2+y^2=25$

$4^2+(-3)^2\stackrel{?}{=}25$

$16+9\stackrel{?}{=}25$

$25=25$ ✓

(4,-3) lies on the circle centered at (0,0) containing the point (-5,0)