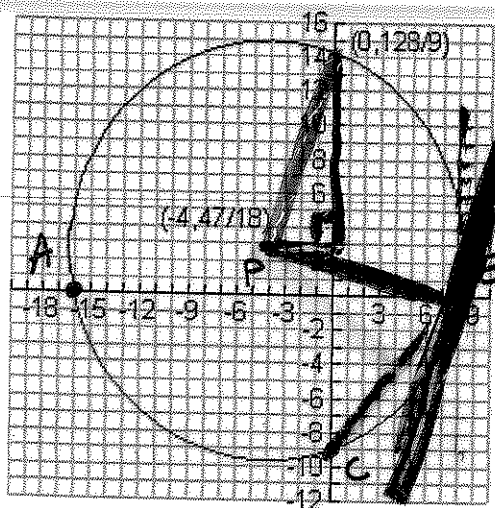


1. Find the equation of a circle with center $(-4, 47/18)$ that contains the point $(0, 128/9)$



$$r = \sqrt{4^2 + \left(\frac{128}{9} - \frac{47}{18}\right)^2}$$

$$r = \sqrt{150.8179012}$$

or

$$r = \sqrt{\frac{48865}{324}}$$

$$(x+4)^2 + \left(y - \frac{47}{18}\right)^2 = \frac{48865}{324}$$

2. Find the coordinates of the point where the circle crosses the negative x axis and label it A on the graph

$$(x+4)^2 + \left(0 - \frac{47}{18}\right)^2 = \frac{48865}{324}$$

$$x = \pm 12 - 4$$

$$(x+4)^2 = 144$$

$$(-16, 0) \quad (8, 0)$$

3. Find the coordinates of the point where the circle crosses the positive x axis and label it B on the graph

$$(8, 0)$$

4. Find the coordinates of the point where the circle crosses the negative y axis and label it C on the graph

$$(0+4)^2 + \left(y - \frac{47}{18}\right)^2 = \frac{48865}{324}$$

$$y = \pm \frac{209}{18} + \frac{47}{18}$$

$$\left(y - \frac{47}{18}\right)^2 = \frac{43681}{324}$$

$$\left(0, 14\frac{2}{9}\right) \quad (0, -9)$$

5. Write the equation of line AB

$$y = 0$$

6. Write the equation of the perpendicular bisector of line BC

$$m_{\overline{BC}} = \frac{9}{8}$$

$$\text{line } \perp m = -\frac{8}{9}$$

$$\text{mid pt } BC (4, -4.5)$$

$$y + 4.5 = -\frac{8}{9}(x - 4)$$

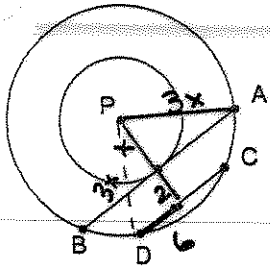
7. Write the equation of the tangent line thru B

$$m_{\overline{PB}} = \frac{\frac{47}{18}}{-4-8} = \frac{-47}{216}$$

$$\text{tangent line } m = \frac{216}{47}$$

$$y = \frac{216}{47}(x - 8)$$

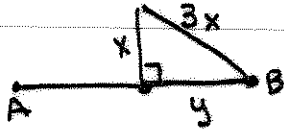
8. AB is 2 cm less from P than CD. The two circles are concentric circles such that the radius of the larger circle is three times the radius of the small circle. $AB \parallel CD$ and $CD = 12$. Find AB and the radii of the 2 concentric circles.



Let $x = \text{radius}$
Small \odot

$$\frac{6^2 + (x+2)^2}{y_1} = \frac{(3x)^2}{y_2}$$

intersect at $x = 2.5$



$$2.5^2 + y^2 = 7.5^2$$

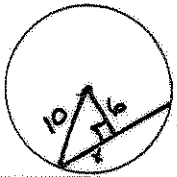
$$x = 2.5 \text{ cm}$$

$$3x = 7.5 \text{ cm} \quad AB = 2\sqrt{50} \text{ cm}$$

$$y^2 = 50$$

$$y = \sqrt{50}$$

9. In a circle whose radius is 10 inches a chord is 6 inches from the center. How long is the chord?



chord = $2x$

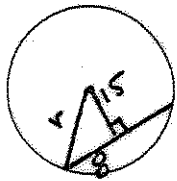
$$x^2 + 6^2 = 10^2$$

$$x^2 = 64$$

$$x = 8$$

Chord = $16''$

10. A chord 16 inches long is 15 inches from the center of the circle. What is the radius of the circle?



$$8^2 + 15^2 = r^2$$

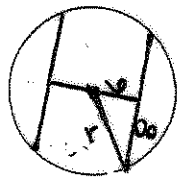
$$64 + 225 = r^2$$

$$289 = r^2$$

$$17 = r$$

$17''$

11. Two parallel chords of a circle each have length 16 inches. The distance between them is 12 inches. Find the radius of the circle.



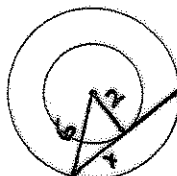
$$6^2 + 8^2 = r^2$$

$$100 = r^2$$

$$10 = r$$

$10''$

12. Two concentric circles have radii 2 inches and 6 inches. Find the length of any segment that is a chord of the larger circle and is tangent to the smaller circle.



chord = $2x$

$$x^2 + 2^2 = 6^2$$

$$x^2 = 32$$

$$x = \sqrt{32}$$

Chord $2\sqrt{32}''$

Solutions: 8. $2\sqrt{50}$ cm, 2.5cm, 7.5cm 9. $16''$ 10. $17''$ 11. $10''$ 12. $2\sqrt{32}''$