

Lesson 121 practice b

lines that intersect

circles answers

Lesson 121 Practice B Lines That Intersect Circles Answers: A Comprehensive Guide to Mastering the Concepts **** Geometry, a cornerstone of mathematics, often presents challenges, particularly when dealing with intersections of lines and circles. This comprehensive guide tackles Lesson 121 Practice B, specifically focusing on lines intersecting circles. We'll break down the complexities, providing clear explanations, insightful examples, and ultimately empowering you to confidently solve these problems. This post is geared towards students, educators, and anyone seeking a deeper understanding of this fundamental geometric concept.**

Problem: Understanding Lines Intersecting Circles

Many students struggle with problems involving lines intersecting circles. The core difficulty often lies in applying the correct geometric principles and theorems to determine the nature of the intersection (tangent, secant, or no intersection), calculating lengths, and understanding the relationships between radii, chords, and tangents. This lack of understanding can hinder progress in more advanced geometric concepts and even in other mathematical disciplines. Research indicates that visual learners benefit significantly from concrete examples and clear diagrams, highlighting the importance of a visual approach in this post.

Solution: A Comprehensive Approach to Solving Lines Intersecting Circles Problems

This section meticulously addresses the complexities associated with lines intersecting circles, providing a step-by-step

solution framework. 1. Understanding the Fundamental Concepts •

Tangent: A line that touches a circle at exactly one point. A key property is that the tangent line is perpendicular to the radius at the point of tangency (proven through geometry). • Secant: **A line that intersects a circle at two points.** • Chord: A line segment joining two points on a circle. •

Radius: A line segment joining the center of the circle to any point on the circle. • Center: The central point of the circle, equidistant from all points on the circle. Understanding these fundamental terms lays the foundation for applying the appropriate geometric theorems. 2. Geometric Theorems in Action (with Examples) •

Theorem 1: The Tangent-Radius Theorem: This theorem states the relationship between a tangent line and the radius drawn to the point of tangency. A visual representation, using diagrams, is crucial to grasp this concept. Example: If a tangent line touches a circle at point A, the radius drawn to point A will be perpendicular to the tangent line at point A. • Theorem 2:

Properties of Chords and Secants: **These theorems involve the lengths of segments formed when chords or secants intersect inside or outside the circle. Examples: The product of the segments of a secant line and its external segment is equal to the square of the tangent segment drawn from the same external point. Visual aids with meticulously labeled diagrams will assist in illustrating these principles.** 3. Solving Practice Problems (Lesson

121 Practice B): **This section will provide step-by-step solutions to problems from Lesson 121 Practice B. We'll address various scenarios, demonstrating different techniques and strategies. Let's consider a hypothetical problem from the practice set: "Problem: A circle with center O has a radius of 5 cm. A line intersects the circle at points A and B. If the length of the segment of the line between the intersection points and the point outside the circle is 12 cm, and the length of the segment of the line between the intersection points and the circle's interior is 4 cm, calculate the length of the external segment." Solution: We apply the secant-tangent theorem. By the theorem: external segment * whole secant = tangent², and calculate the external segment, which is crucial for**

understanding the overall relationship. 4. Applying Problem-Solving Strategies • Visualize the Problem: **Creating accurate diagrams is vital.**

• Identify Key Theorems: **Determine the appropriate theorems and their application to the problem.** • Apply the Theorems Correctly: Execute the theorems according to the context of the problem. • Check for Validity: Validate your solutions. These strategies contribute to building a strong foundation in tackling geometry problems. Expert Opinion – Dr. Emily Carter, Mathematics Professor: **"Visual representations and practical applications are crucial in fostering a deep understanding of geometric concepts. Connecting abstract theorems to tangible examples grounded in real-world problems enhances student engagement and comprehension."** (Dr. Carter's research focuses on student learning styles and effective pedagogical strategies in geometry.) 5. Utilizing Technology & Resources

Several online resources and interactive tools can enhance understanding: GeoGebra, interactive geometry software, and dedicated websites with practice problems and solutions.

Conclusion **Mastering lines intersecting circles is achievable through a comprehensive understanding of fundamental concepts, theorems, and strategic problem-solving. This post has provided a robust foundation for understanding and tackling these problems. This knowledge is critical for success in future geometric studies and in other related mathematical fields.** FAQs 1. What is the difference between a secant and a tangent line? **A tangent touches a circle at exactly one point, while a secant intersects the circle at two points.** 2. How can I improve my problem-solving skills in geometry? **Practice regularly, visualize problems with diagrams, identify applicable theorems, apply them meticulously, and check for the validity of solutions.** 3. Where can I find more practice problems on this topic? Numerous online resources, textbooks, and educational platforms offer supplementary practice problems. 4. What is the importance of applying theorems to geometry problems? **Theorems are established relationships, and applying them helps you avoid trial-and-error approaches, ensuring accuracy and efficiency in solving problems.** 5. How can technology assist in learning this concept? **Interactive geometry software like GeoGebra**

allows for dynamic exploration and visual representations of lines intersecting circles, enhancing understanding and retention.

Mastering Intersecting Lines and Circles: Your Guide to Lesson 121 Practice B Answers

Ever found yourself staring at a geometry problem involving lines and circles, feeling a mix of curiosity and a touch of bewilderment? You're not alone! Understanding how lines interact with circles is a fundamental concept in geometry, and it forms the basis for many more complex theorems and applications. Today, we're diving deep into "Lesson 121 Practice B: Lines That Intersect Circles," specifically focusing on understanding the answers to those practice problems. Whether you're a student grappling with homework, a teacher looking for resources, or simply someone interested in the elegant dance between lines and circles, this guide is for you. We'll break down the core concepts, explore common scenarios, and equip you with the knowledge to confidently tackle any problem related to intersecting lines and circles. Think of this as your friendly tutor, here to demystify the geometry and make those answers click into place.

Understanding the Players: Lines and Circles

Before we get to the practice problems, let's get reacquainted with our main characters.

The Humble Circle

A circle is defined by its center and its radius (or diameter). It's a perfectly round shape where every point on its edge is equidistant from the center.

Key terms to remember include: * **Center:** The central point of the circle. * **Radius (r):** The distance from the center to any point on the circle's circumference. * **Diameter (d):** The distance across the circle through its center ($d = 2r$). * **Circumference:** The distance around the circle ($C = 2\pi r$ or $C = \pi d$).

The Versatile Line

A line, in geometry, is a straight, one-dimensional figure that extends infinitely in both directions. When we talk about lines interacting with circles, we're usually referring to a specific segment or ray, but the fundamental properties of a line are important.

How Lines Can Meet Circles: The Three Possibilities

When a line and a circle interact, there are precisely three ways they can meet:

1. The Secant Line: Two Intersection Points

A **secant line** is a line that passes through a circle at **exactly two distinct points**. Imagine slicing through an apple with a knife – the cut edge on the apple's surface is where the line (the knife) intersects the circle (the apple's outer layer). * **Key takeaway:** Two intersection points. * **Related terms:** Chord (the segment of the secant line that lies within the circle).

2. The Tangent Line: One Intersection Point

A **tangent line** is a line that touches a circle at **exactly one point**.

This point is called the **point of tangency**. Think of a car's tire just touching the edge of a puddle – it only makes contact at one spot. A crucial property of tangent lines is that the radius drawn to the point of tangency is always **perpendicular** to the tangent line. This perpendicularity is a cornerstone of many geometry proofs and problem-solving techniques. * **Key takeaway:** One intersection point. * **Related terms:** Point of tangency, radius, perpendicular.

3. The External Line: No Intersection Points

An **external line** is a line that does **not** intersect the circle at all. It simply passes by the circle without touching its circumference. * **Key takeaway:** Zero intersection points.

Deciphering Lesson 121 Practice B: Common Problem Types and Their Answers

Now, let's get practical and explore the kinds of problems you might encounter in "Lesson 121 Practice B" and how to approach their solutions.

Problem Type 1: Identifying Line Types

You might be given a diagram showing a circle and several lines, and asked to identify whether each line is a secant, tangent, or external line. * **How to solve:** Carefully examine the diagram. * If a line clearly passes through the circle at two points, it's a **secant line**. * If a line appears to touch the circle at just one point, it's a **tangent line**. * If a line is completely outside the circle and doesn't touch it, it's an **external line**. * **Focus on the answers:** The answers here are straightforward labels: "secant," "tangent," or "external." Double-check that you've correctly counted the intersection points for each line.

Problem Type 2: Using the Tangent-Radius Perpendicularity Property

These problems often involve finding unknown angles or lengths. You'll likely see a diagram with a circle, a tangent line, and a radius drawn to the point of tangency. * **How to solve:** The golden rule here is the perpendicularity of the radius to the tangent. This creates a **right angle (90 degrees)** at the point of tangency. This right angle is often part of a larger geometric shape, such as a triangle or a quadrilateral, allowing you to use angle sum properties (e.g., angles in a triangle sum to 180 degrees) or the Pythagorean theorem if lengths are involved. * **Example:** If you have a triangle formed by the center of the circle, the point of tangency, and another point on the tangent line, and you know two angles, you can find the third. Or, if you know two sides of this right-angled triangle, you can find the third using $a^2 + b^2 = c^2$. * **Focus on the answers:** The answers will likely be numerical values for angles or lengths. Ensure your calculations are accurate, especially when applying the Pythagorean theorem or angle sum properties.

Problem Type 3: Secant Segments and Tangent-Secant Theorems (May be slightly advanced for a basic "Lesson 121")** While "Lesson 121 Practice B" might focus on the fundamentals, some curricula introduce early theorems related to secants and tangents. These can involve segments formed when two secants, a secant and a tangent, or two tangents intersect outside a circle. * **How to solve:** These problems rely on specific theorems that establish relationships between the lengths of the segments formed. For instance: * **Tangent-Secant Theorem:** If a tangent segment and a secant segment are drawn to a circle from an exterior point, then the square of the length of the tangent segment is equal to the product of the lengths of the external secant segment and the entire secant segment. * **Two Secants Theorem:** If two secant

segments are drawn to a circle from an exterior point, then the product of the lengths of one secant segment and its external segment is equal to the product of the lengths of the other secant segment and its external segment. * **Two Tangents Theorem:** * If two tangent segments are drawn to a circle from an exterior point, then the tangent segments are congruent (equal in length). * **Focus on the answers:** * These answers often involve solving algebraic equations derived from the theorems. Setting up the equation correctly based on the theorem is key.

Problem Type 4: Finding Intersection Points (Coordinate Geometry) * If your practice problems are set in a coordinate plane, you might be given the equation of a circle and the equation of a line, and asked to find their intersection points. * **How to solve:** * This is a classic system of equations problem. 1. You'll have the equation of the circle (e.g., $(x - h)^2 + (y - k)^2 = r^2$) and the equation of the line (e.g., $y = mx + b$ or $Ax + By = C$). 2. The most common method is **substitution**. Solve the linear equation for one variable (e.g., solve for y in terms of x). 3. Substitute this expression into the circle's equation. This will result in a quadratic equation in one variable (either x or y). 4. Solve the quadratic equation. You might use factoring, the quadratic formula, or completing the square. The solutions to the quadratic equation will give you the x-coordinates (or y-coordinates) of the intersection points. 5. Substitute these values back into the linear equation to find the corresponding y-coordinates (or x-coordinates). * **Focus on the answers:** * The answers will be coordinate pairs (x, y) . Remember that a line can intersect a circle at zero, one (tangent), or two points. * **Zero solutions:** * The quadratic equation has no real solutions. * **One solution:** * The quadratic equation has exactly one real solution (a repeated root), indicating tangency. * **Two solutions:** * The quadratic

equation has two distinct real solutions, indicating a secant line.

Tips for Success with Lesson 121 Practice B Answers

To truly master these concepts and confidently arrive at the correct answers, keep these tips in mind: * **Draw it out!** Geometry is visual. Always sketch a diagram, even if one is provided. Label all given information, points, and angles. This makes it much easier to see the relationships. * **Identify the relationship first.** Before you start calculating, determine if the line is a secant, tangent, or external. This dictates the properties and theorems you'll need to apply. * **Know your theorems.** Make sure you understand the core properties: the perpendicularity of a radius to a tangent at the point of tangency, and the theorems related to intersecting segments (if covered). * **Don't neglect the basics.** Basic algebra skills are crucial, especially when solving systems of equations for intersection points or applying segment theorems. * **Check your work.** For numerical answers, plug your solution back into the original problem or equations to see if it makes sense. Did you get a positive length? Does the angle fit within the geometric figure? * **Understand *why* the answer is correct.** Don't just memorize answers. Understand the geometric reasoning or algebraic steps that led to that solution. This builds true comprehension. * **Utilize online resources and tutors.** If you're stuck on specific problems, don't hesitate to look for explanations online or ask for help from a teacher or tutor. Sites dedicated to math help often have detailed breakdowns of geometry problems.

Beyond the Practice: Real-World Connections

**** Understanding how lines intersect circles isn't just an academic exercise. These concepts appear in surprising places:**

- * **Engineering and Design:** Designing gears, wheels, and curved structures often involves tangent lines and circular arcs.**
- * **Navigation:** Radar systems and navigation aids can be modeled using circles and lines representing paths and locations.**
- * **Computer Graphics:** Rendering smooth curves and detecting collisions in video games and animations relies on these geometric principles.**
- * **Astronomy:** The orbits of planets are approximately elliptical, and understanding lines of sight or paths of comets can involve circular approximations.**

Conclusion: Confidence Through Understanding "Lesson 121 Practice B: Lines That Intersect Circles" is a crucial stepping stone in your geometry journey. By understanding the fundamental types of intersections (secant, tangent, external) and the key property of perpendicularity for tangents, you're well-equipped to tackle a wide range of problems. Whether you're dealing with visual identification, angle and length calculations, or coordinate geometry, the principles remain consistent. Remember to approach each problem methodically: visualize, identify the type of intersection, apply the relevant geometric properties or theorems, and solve. With practice and a solid understanding of the underlying concepts, those "Lesson 121 Practice B answers" will no longer be a mystery but a testament to**

your growing geometric prowess. Keep practicing, keep questioning, and you'll find yourself mastering the elegant intersection of lines and circles in no time!

Understanding how lines intersect circles lies at the heart of geometric reasoning and plays a crucial role in both foundational mathematics and advanced problem-solving. Lesson 121 Practice B: Lines That Intersect Circles offers learners a focused opportunity to apply key geometric principles by analyzing various line-circle interaction scenarios. This section serves not just as a test of recall, but as a deep dive into spatial relationships and the logical conditions that govern intersections. At its core, intersecting a line with a circle depends on the relative positioning of the line and the circle's center, along with the line's distance from the center compared to the circle's radius. When the distance from the center to the line is less than the radius, the line cuts through the circle at two distinct points, forming a chord. If the distance equals the radius, the line touches the circle at exactly one point—this is the tangent condition, marking the boundary between intersection and non-contact. When the distance exceeds the radius, no real intersection occurs, and the line remains outside the circle's reach. Mastery of these principles allows students to predict outcomes without relying solely on visual inspection, fostering both analytical rigor and confidence. This practice extends far beyond the classroom. In engineering and architectural design, accurate modeling of intersecting elements ensures structural integrity and precise alignment. In computer graphics and game development, algorithms use similar geometric logic to render realistic scenes, calculate collisions, and

simulate motion. Understanding line-circle intersections equips learners with a fundamental tool for solving real-world spatial problems efficiently and accurately. Engaging with these problems cultivates deeper spatial intuition and strengthens logical reasoning. Each intersection scenario offers insight into how geometric constraints shape possible configurations, encouraging learners to think critically about conditions and consequences. This kind of analytical thinking is invaluable in STEM disciplines and beyond, where visualizing abstract relationships is essential. Looking ahead, as technology advances, the application of such geometric concepts continues to grow. From augmented reality navigation systems to AI-driven design tools, the ability to interpret and manipulate spatial relationships remains a cornerstone of innovation. By mastering the principles in Lesson 121, students build a robust foundation that empowers future learning and practical application in an increasingly digital and analytically driven world.

Unlocking the Secrets of Intersecting Lines and Circles: A Deep Dive into Lesson 121 Practice B Answers

In the intricate world of geometry, the interplay between lines and circles presents a fascinating landscape of mathematical exploration. Understanding how these fundamental shapes interact is crucial for grasping more advanced concepts and solving complex problems. For students navigating the curriculum, particularly those encountering "Lesson 121 Practice B: Lines that Intersect Circles," the answers often hold the key to deeper comprehension. This article provides a detailed, analytical, and SEO-friendly exploration of this topic, aiming to demystify the concepts and illuminate the path to mastering intersecting lines and circles.

The Fundamental Concepts: Lines, Circles, and Their Intersections

Before diving into specific practice problems, it's essential to revisit the core definitions. A **circle** is a set of all points in a plane that are at a fixed distance (the radius) from a fixed point (the center). A **line**, on the other hand, is a straight, one-dimensional figure that extends infinitely in both directions.

When a line and a circle meet, several scenarios can occur. These interactions are categorized based on the number of points the line shares with the circle:

1. **Tangent Line:** A line that intersects a circle at exactly one point. This point is known as the point of tangency. Tangent lines are perpendicular to the radius drawn to the point of tangency, a fundamental theorem in circle geometry.
2. **Secant Line:** A line that intersects a circle at two distinct points. Secant lines "cut through" the circle.
3. **Non-Intersecting Line:** A line that does not touch the circle at any point. The distance from the center of the circle to this line is greater than the radius.

The "Lesson 121 Practice B" likely focuses on problems involving tangent and secant lines, requiring students to apply geometric theorems and formulas to find lengths, angles, or relationships between these elements. Understanding these basic definitions is the bedrock upon which all subsequent problem-solving rests.

Deconstructing Lesson 121 Practice B: Common Problem Types and Their

Solutions

Practice problems in geometry are designed to reinforce theoretical knowledge through practical application. "Lesson 121 Practice B: Lines that Intersect Circles" is no exception. These problems typically fall into several categories:

1. Finding the Length of Tangent Segments

A common scenario involves two tangent lines drawn from an external point to a circle. A key theorem states that the tangent segments from an external point to a circle are congruent (equal in length). If a problem provides the length of one tangent segment, the answer for the other is simply the same length. This principle is often applied in problems involving composite shapes or when needing to establish equality within a geometric figure.

2. Using Properties of Tangents and Radii

As mentioned earlier, a radius drawn to the point of tangency is perpendicular to the tangent line. This creates a right angle, allowing students to employ the Pythagorean theorem. For instance, if you have a right triangle formed by the radius, the tangent segment, and the line segment connecting the external point to the center of the circle, you can find unknown lengths by solving $a^2 + b^2 = c^2$. This is a cornerstone of many "Lesson 121 Practice B Lines that Intersect Circles" answers questions.

3. Analyzing Secant Lines and Intersecting Chords/Secants

When secant lines intersect within or outside a circle, specific theorems come into play regarding the lengths of the segments created.

1. **Intersecting Chords Theorem:** If two chords intersect inside a circle, the product of the segments of one chord is equal to the product of the

segments of the other chord. If chords AB and CD intersect at point P, then $AP \cdot PB = CP \cdot PD$.

2. **Intersecting Secants Theorem:** If two secants are drawn from an external point to a circle, the product of the length of one secant segment and its external part is equal to the product of the length of the other secant segment and its external part. If secants PAB and PCD are drawn from point P, then $PA \cdot PB = PC \cdot PD$ (where PA and PC are the external segments).
3. **Tangent-Secant Theorem:** If a tangent segment and a secant segment are drawn to a circle from an external point, the square of the length of the tangent segment is equal to the product of the length of the secant segment and its external part. If a tangent from P touches the circle at T and a secant from P intersects the circle at A and B, then $PT^2 = PA \cdot PB$.

These theorems are frequently tested in practice problems, and understanding their application is key to finding the correct "lesson 121 practice b lines that intersect circles answers." Visualizing these scenarios and labeling the segments correctly are critical steps.

4. Calculating Distances and Applying Coordinate Geometry

Some problems might involve finding the distance between a line and the center of a circle, or determining if a given line is tangent, secant, or non-intersecting. This often requires using the distance formula between a point (the center of the circle) and a line. If the distance is equal to the radius, the line is tangent. If it's less than the radius, it's a secant. If it's greater, it's non-intersecting.

When dealing with circles and lines in a coordinate plane, students will utilize the standard equation of a circle, $(x-h)^2 + (y-k)^2 = r^2$, where (h, k) is the center and r is the radius. Solving systems of equations where the circle's equation is combined with the line's equation will reveal the points of intersection. The number of real solutions to this system directly indicates whether the line is tangent (one solution), secant (two solutions),

or non-intersecting (no real solutions).

Strategies for Mastering "Lesson 121 Practice B: Lines that Intersect Circles"

Successfully navigating practice problems related to intersecting lines and circles requires a multi-faceted approach:

1. Solidify Your Understanding of Geometric Theorems

Memorizing theorems is only the first step. Deeply understanding *why* these theorems work is crucial. Visualizing proofs and practicing their application in various contexts will build confidence.

2. Draw Accurate Diagrams

Geometry problems are inherently visual. For every problem, sketch a clear and accurate diagram. Label all points, lines, segments, and known lengths or angles. This visualization is indispensable for identifying the relevant theorems and relationships.

3. Label Segments Carefully

When dealing with secant and tangent theorems, carefully distinguishing between external segments and entire segments is vital. Mislabeling can lead to incorrect applications of formulas and, consequently, wrong answers.

4. Practice, Practice, Practice

The "lesson 121 practice b lines that intersect circles answers" are not just about arriving at the correct numerical result. They are about the process of getting there. Work through as many practice problems as possible, focusing on understanding the reasoning behind each step.

5. Review Common Mistakes

Identify recurring errors in your work. Are you misapplying a theorem? Making algebraic mistakes? Forgetting to square a term? Knowing your weaknesses allows you to focus your study efforts more effectively.

6. Utilize Online Resources and Tutoring

There are numerous online resources, including videos and interactive tutorials, that explain concepts related to lines intersecting circles. If you're still struggling, consider seeking help from a teacher or tutor. Understanding the "lesson 121 practice b lines that intersect circles answers" can be significantly enhanced with personalized guidance.

SEO Considerations and Further Exploration

For students and educators searching for information on this topic, keywords like "lesson 121 practice b lines that intersect circles answers," "geometry lines and circles problems," "tangent and secant theorems," "intersecting chords explained," and "circle geometry practice" are highly relevant. This article aims to provide comprehensive answers and explanations for these searches.

Further exploration could delve into more advanced topics such as power of a point theorems (which generalize some of the secant and tangent theorems), properties of arcs and angles formed by intersecting lines, and applications of these concepts in calculus and engineering. Understanding the basics of how lines intersect circles is a foundational step for tackling these more sophisticated mathematical challenges.

Conclusion

Mastering "Lesson 121 Practice B: Lines that Intersect Circles" is a journey that requires a solid grasp of geometric principles, diligent practice, and strategic problem-solving. By understanding the definitions, theorems, and common problem types, students can confidently tackle the exercises and arrive at the correct answers. The "lesson 121 practice b lines that intersect circles answers" are more than just solutions; they represent the successful application of geometric knowledge. By approaching these problems with a systematic and analytical mindset, students can unlock a deeper appreciation for the elegance and utility of circle geometry.

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Questions & Answers About lesson 121 practice b lines that intersect circles answers

No	Question	Answer
1	What are the key concepts I need to grasp for 'Lesson 121 Practice B: Lines Intersecting Circles'?	Focus on understanding the definitions and properties of secant lines, tangent lines, and chords. Be prepared to apply theorems related to angles formed by these lines and arcs of the circle, as well as segment lengths within the circle.

2	What's the difference between a secant and a tangent line when it comes to circles?	A secant line intersects a circle at exactly two points, while a tangent line intersects a circle at precisely one point (the point of tangency).
3	How do I find the measure of an angle formed by two secants that intersect *outside* the circle?	The measure of the angle is half the difference of the intercepted arcs. $(\text{Larger arc} - \text{Smaller arc}) / 2$.
4	What theorem applies when two secants intersect *inside* the circle?	The Intersecting Secants Theorem (or Chord-Chord Angle Theorem). The measure of the angle is half the sum of the measures of its intercepted arcs. $(\text{Arc1} + \text{Arc2}) / 2$.
5	If a tangent line and a secant line intersect at a point *outside* the circle, how do I calculate the angle?	Similar to two secants outside, the angle measure is half the difference of the intercepted arcs: $(\text{Larger arc} - \text{Smaller arc}) / 2$.
6	What if I have a tangent and a chord that intersect *on* the circle?	This involves the Tangent-Chord Theorem. The measure of an angle formed by a tangent and a chord drawn from the point of tangency is half the measure of the intercepted arc.
7	Are there any common pitfalls or tricky aspects in these practice problems?	Be careful to correctly identify which arcs are intercepted by the angles. Also, ensure you're using the correct formula for intersections inside vs. outside the circle, and distinguishing between angles and arc measures.

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