

TEACHER AND STUDENT RESOURCE

Circle Theorems Angles Segments and Geometric Evidence



NC Math 3 • NC.M3.G-C.2

Circles

Seven instructional sections with 30 multiple-choice and 30 open or performance tasks, teaching scripts, original mathematical visuals, generous workspaces, and worked keys.

Free sample | Contents

NC.M3.G-C.2 | NC Math 3 mathematics

This sample contains 22 complete selected pages from the 116-page resource, plus this sample contents page. Original printed page numbers are retained. Gaps are intentional.

Included original pages: 1-17, 32-33, 65, 84-85

Representative activities

M01: sample PDF page(s) 18; original page(s) 17

M02: sample PDF page(s) 18; original page(s) 17

O01: sample PDF page(s) 19; original page(s) 32

O02: sample PDF page(s) 20; original page(s) 33

Selected teacher prompts and keys: original page(s) 65, 84-85

Using this sample

Read the preparation and access guidance before using a selected activity.
Keep teacher keys and private preparation pages separate from student copies.
Use the original resource contents to see the scope of the complete packet.

Complete paid download

The complete resource includes the full PDF task bank and teaching materials.

ALIGNMENT

Standard and learning targets

Understand and apply theorems about circles.

- Understand and apply theorems about relationships with angles and circles, including central, inscribed and circumscribed angles.
- Understand and apply theorems about relationships with line segments and circles including, radii, diameter, secants, tangents and chords.

T1 Identify circle-related angles and segments and state the hypotheses that distinguish central, inscribed, circumscribed, chord, secant and tangent configurations.

T2 Determine and justify angle and arc measures using central, inscribed, tangent-chord, intersecting-chord, exterior-secant and circumscribed-angle relationships.

T3 Apply and derive radius, diameter, chord, tangent and secant length relationships, preserving whole-segment labels and positive-length domains.

T4 Construct, prove and critique circle configurations, verifying theorem hypotheses, minor/major arc choices and simultaneous geometric feasibility.

Each item names its own target. The bank supports multiple sessions; do not assign all 60 tasks in one sitting.

NAVIGATION

Choose evidence deliberately

Warm-up: M01-M04 and O01-O04**I Do: M05-M08 and O05-O08****We Do: M09-M13 and O09-O13****Collaborative practice: M14-M18 and O14-O18****Independent practice: M19-M23 and O19-O23****Small-group reteach: M24-M27 and O24-O27****Exit ticket: M28-M30 and O28-O30**

T1: M01, M02, M04, O01, O27

T2: M03, M05, M06, M07, M09, M10, M11, M12, M18, M19, M23, M25, M28, M29, O02, O03, O05, O06, O09, O11, O12, O28

T3: M08, M13, M14, M15, M16, M17, M22, M24, M26, O07, O08, O13, O18, O19, O22, O24, O26

T4: M20, M21, M27, M30, O04, O10, O14, O15, O16, O17, O20, O21, O23, O25, O29, O30

DAILY LEARNING TARGETS

A multi-session teaching path

Session 1 Identify and explain

Learning target: Identify circle-related angles and segments and state the hypotheses that distinguish central, inscribed, circumscribed, chord, secant and tangent configurations.

Learning target: Determine and justify angle and arc measures using central, inscribed, tangent-chord, intersecting-chord, exterior-secant and circumscribed-angle relationships.

Use Warm-up and I Do selections. In O01 distinguish the full secant line from its diameter segment. Model O05 or O06 before asking learners to justify the factor of two or supplementary relationship.

Session 2 Apply and derive

Learning target: Determine and justify angle and arc measures using central, inscribed, tangent-chord, intersecting-chord, exterior-secant and circumscribed-angle relationships.

Learning target: Apply and derive radius, diameter, chord, tangent and secant length relationships, preserving whole-segment labels and positive-length domains.

Use We Do and Collaborative tasks. Require near/far and external/whole labels before equations. In O07 and O08, build the product theorem from a named triangle correspondence.

Session 3 Construct and audit

Learning target: Apply and derive radius, diameter, chord, tangent and secant length relationships, preserving whole-segment labels and positive-length domains.

Learning target: Construct, prove and critique circle configurations, verifying theorem hypotheses, minor/major arc choices and simultaneous geometric feasibility.

Use Independent, targeted Small-group and Exit tasks. Assess constructions against every condition, including root domains and feasibility; compare a correct numerical product with the impossible configuration in O16.

PLANNING

Materials, access and pacing

Materials

Pencil, ruler, compass, protractor, graph paper and optional colored pencils. Provide the full blank grids for construction tasks; retain auxiliary circles and angle/segment markings. Calculators may check approximations but exact values are the assessment target.

Prerequisites

Distinguish lines, rays and segments; use triangle angle sums, perpendicularity, congruence and similarity; solve linear and quadratic equations; use positive square roots and exact squared distances. Coordinate constructions support theorem checks rather than replacing geometric explanations.

Pacing

Use a short diagnostic warm-up, a model and shared task in one session; collaborative and independent reasoning in later sessions; then targeted reteaching and an exit task. Select two to four tasks at a time based on evidence. Each section's full bank is reusable, not mandatory in one lesson.

Neutral access

Read directions aloud without interpreting the graph, enlarge a page, supply a writing or pointing response method, and allow a learner to dictate an explanation. Keep axes, units, data and mathematical demand unchanged.

Separate instruction from evidence

Keep the learner's first response. Record answer-supplying cues separately from access supports. A completed teacher graph or worked key is for discussion after independent work, never a student construction template.

PLANNING CONTINUED

Materials, access and pacing

Review convention

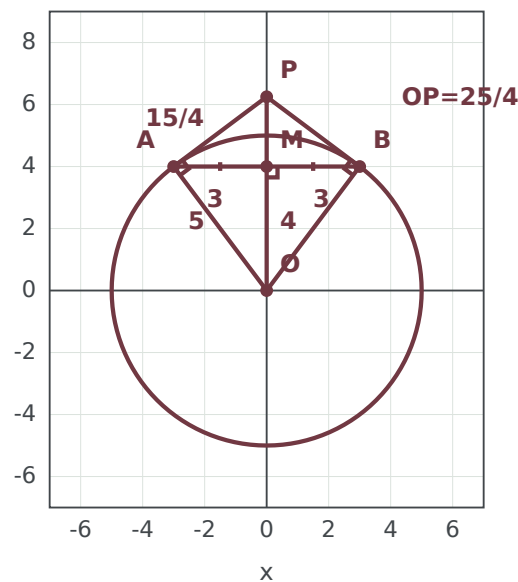
All circles have positive radius. All supplied lengths and angle measures are exact. Arc measures use degrees, not arc length. Minor arcs are strictly less than 180 degrees; 180-degree arcs are semicircles, and major arcs exceed 180 degrees. A nonreflex angle is between 0 and 180 degrees. Circumscribed angle here means the interior angle formed by two tangent segments from a common exterior point. For secants, stated point order identifies external, interior and whole lengths. Tangent and secant lines may be represented by finite drawn portions. Circle outlines use equal coordinate scales. A diagram illustrates only explicitly stated givens; completed construction diagrams appear in the teacher key. Accept equivalent exact forms and any construction satisfying every condition.

TEACHER MODEL

One circle must satisfy every angle and length condition

A circle has center $O(0,0)$, radius 5, chord endpoints $A(-3,4)$, $B(3,4)$, and tangents meeting at $P=(0,25/4)$. Identify the right angles, prove the tangent lengths equal, and determine AB , OM and PA , where M is the chord midpoint.

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$M=(0,4)$, so $AM=MB=3$ and $AB=6$. The radius-chord right triangle gives $OM=4$. At A and B each tangent is perpendicular to its radius; the two right triangles OAP and OBP share hypotenuse OP and equal radius legs, so $PA=PB$. Since $OP=25/4$, $PA^2=(25/4)^2-5^2=225/16$, giving $PA=PB=15/4$. The exact dot products $(-3,4) \cdot (3,9/4)=0$ and $(3,4) \cdot (-3,9/4)=0$ verify that these angle and length conditions coexist. Do not infer a tangent just from a line touching a drawn outline.

VISUAL ANCHOR

Locate the vertex and label the entire segment

Central angle = intercepted arc; inscribed angle = half its intercepted arc.

Tangent-chord angle = half the arc inside that specified angle.

Inside intersection: half the sum of the two opposite arcs.

Outside intersection: half the far-minus-near arc difference.

Two tangents: angle + minor arc = 180 degrees.

Inside chord products: part · part = part · part.

Outside power: tangent² = external · whole = external · whole.

Center perpendicular to a chord bisects it; radius to a tangent is perpendicular.

Choose the theorem from the stated geometry, not from the numbers. Keep degree measures distinct from lengths, and check positive lengths and feasible circle dimensions.

REUSABLE REASONING GUIDE

Represent, justify, interpret

Name: _____ Date: _____

Givens, quantities and restrictions**Representation and calculation****Justification or check****Conclusion, domain and units**

WARM-UP

Teaching script

Core: O01 • T1: Identify circle-related angles and segments and state the hypotheses that distinguish central, inscribed, circumscribed, chord, secant and tangent configurations.

Optional bank: M01–M04; O01–O04. Select tasks across more than one meeting if needed.

Suggested discussion/work time: 5–8 minutes. Adjust for access and evidence; this is not a speed criterion.

For M01 and O01, ask: “Where must each endpoint be, and are we naming a line or a segment?” Have learners mark the center before classifying. For M03, trace the arc not containing C before halving. Use O04 to challenge the claim that a point on a circle makes every line through it tangent; require both intersections and the radius-direction test.

Core task

On a coordinate grid, draw the circle centered at $O(0,0)$ with radius 4. Mark $A(-4,0)$, $B(4,0)$ and $C(0,4)$. Draw and label radius OC , diameter AB , non-diameter chord AC , the tangent line at C , and a secant line through A and B . Explain why the segment AB and its full line have different classifications.

Teacher solution and discussion

Draw the radius-4 circle, the x -axis as the full secant, and the horizontal line $y=4$ as the tangent at C . Segment OC has one endpoint at the center; segment AB has endpoints on the circle and passes through O ; AC is a chord but does not pass through O . Mark OC perpendicular to $y=4$ at C . AB is a finite diameter segment, while its full line is a secant meeting the circle twice.

Evidence and response

Show all five requested objects, distinguish a full line from a segment, and mark the tangent-radius right angle at C . Ask the learner to point to the calculation or representation supporting the claim. A selected option alone does not identify a unique misconception.

Closure: Ask learners to state one feature they verified and one check they used. Use the worked key for M01 to compare all alternatives after evidence is collected.

I DO

Teaching script

Core: 005 • T2: Determine and justify angle and arc measures using central, inscribed, tangent-chord, intersecting-chord, exterior-secant and circumscribed-angle relationships.

Optional bank: M05–M08; 005–008. Select tasks across more than one meeting if needed.

Suggested discussion/work time: 10–12 minutes. Adjust for access and evidence; this is not a speed criterion.

Model 005 by first drawing the opposite rays OA and OC, then writing the isosceles-triangle equation that produces the half-angle. In 006 mark both radius-tangent right angles before summing the quadrilateral. For 007 and 008 write the vertex correspondence next to the similarity statement; ask a learner to point to each factor in the resulting product. Do not introduce the product as an unexplained mnemonic.

Core task

In a circle with center O, CA is a diameter, B is on one semicircle, and nonreflex angle AOB=100 degrees. Using equal radii and the angle sum of triangle OBC, derive $m(\angle ACB)$ without quoting the inscribed-angle theorem. Explain the factor of two that your argument reveals.

Teacher solution and discussion

Rays OA and OC are opposite, so $\angle BOC = 180 - 100 = 80$ degrees. Radii OB and OC are equal, so triangle OBC has equal base angles $(180 - 80)/2 = 50$ degrees. Because rays CO and CA are the same ray, $\angle ACB = \angle OCB = 50$ degrees. More generally, if $\angle AOB = \theta$ in this diameter-assisted configuration, the base angle is $[180 - (180 - \theta)]/2 = \theta/2$.

Evidence and response

Use the opposite rays, the two equal radii and the correct ray coincidence to derive the result rather than cite the theorem being explained. Ask the learner to point to the calculation or representation supporting the claim. A selected option alone does not identify a unique misconception.

Closure: Ask learners to state one feature they verified and one check they used. Use the worked key for M05 to compare all alternatives after evidence is collected.

WE DO

Teaching script

Core: 009 • T2: Determine and justify angle and arc measures using central, inscribed, tangent-chord, intersecting-chord, exterior-secant and circumscribed-angle relationships.

Optional bank: M09–M13; O09–O13. Select tasks across more than one meeting if needed.

Suggested discussion/work time: 10–15 minutes. Adjust for access and evidence; this is not a speed criterion.

On M10 and M11, ask the class to locate the vertex before selecting sum or difference. In O09 collect the four solved angles, then require a positive arc partition to verify feasibility. In O11 label both secant rays in near/far order before using the exterior angle. For O13 ask which chord should be closer before calculation and use the exact distances to test that prediction.

Core task

Distinct points A, B, C and D occur in cyclic order on a circle. The interior angles of ABCD are $A=2x+10$, $B=y+25$, $C=3x+20$ and $D=2y+5$ degrees. Determine x , y and all four angles. Give one positive set of consecutive arc measures AB, BC, CD, DA that realizes the resulting angles.

Teacher solution and discussion

Opposite angles give $2x+10+3x+20=180$ and $y+25+2y+5=180$. Therefore $x=30$ and $y=50$, yielding $A=70$, $B=75$, $C=110$ and $D=105$ degrees. One realizing set of consecutive arcs is $AB=130$, $BC=80$, $CD=60$ and $DA=90$ degrees. They sum to 360; angle A intercepts $BC+CD=140$, B intercepts $CD+DA=150$, C intercepts $DA+AB=220$, and D intercepts $AB+BC=210$. Halving verifies all four angles.

Evidence and response

Solve the two independent supplementary pairs and supply positive arcs that establish actual cyclic feasibility, not just a 360-degree angle total. Ask the learner to point to the calculation or representation supporting the claim. A selected option alone does not identify a unique misconception.

Closure: Ask learners to state one feature they verified and one check they used. Use the worked key for M09 to compare all alternatives after evidence is collected.

COLLABORATIVE PRACTICE

Teaching script

Core: O14 • T4: Construct, prove and critique circle configurations, verifying theorem hypotheses, minor/major arc choices and simultaneous geometric feasibility.

Optional bank: M14–M18; O14–O18. Select tasks across more than one meeting if needed.

Suggested discussion/work time: 15–20 minutes. Adjust for access and evidence; this is not a speed criterion.

Assign constructor, theorem checker and skeptic roles. Each student records an independent prediction first. O14 requires two separate circles, not two candidate centers left on an unfinished sketch. In O15 retain the auxiliary diameter circle and have the checker identify the right-angle theorem. O16 is deliberately numerically tempting: the skeptic must test the supplied radius and center distance after the power product matches. O17 requires two complete, separately justified constructions.

Core task

The fixed segment $A(-6,0)B(6,0)$ must be a chord of a circle. The center must be exactly 8 units from the line AB . On separate grids construct both possible circles, label their centers and radii, and explain why there are exactly two rather than infinitely many.

Teacher solution and discussion

A center equidistant from A and B lies on the perpendicular bisector $x=0$. Distance 8 from the line $y=0$ requires the center to have y -coordinate 8 or -8 , giving $O_1=(0,8)$ and $O_2=(0,-8)$. Each radius is $\sqrt{6^2+8^2}=10$. Draw a radius-10 circle about each center, mark the chord midpoint $M=(0,0)$, and mark OM perpendicular to AB with $AM=MB=6$. The intersection of the perpendicular-bisector condition with the two distance-8 parallel lines gives exactly these two centers.

Evidence and response

Produce both completed circles with correct centers, radius and bisection/right-angle markings, and justify that no other center meets both conditions. Ask the learner to point to the calculation or representation supporting the claim. A selected option alone does not identify a unique misconception.

Closure: Ask learners to state one feature they verified and one check they used. Use the worked key for M14 to compare all alternatives after evidence is collected.

INDEPENDENT PRACTICE

Teaching script

Core: O19 • T3: Apply and derive radius, diameter, chord, tangent and secant length relationships, preserving whole-segment labels and positive-length domains.

Optional bank: M19–M23; O19–O23. Select tasks across more than one meeting if needed.

Suggested discussion/work time: 15–20 minutes. Adjust for access and evidence; this is not a speed criterion.

Provide O19–O23 without answer-supplying cues. On O20 distinguish a strict minor arc from a semicircle and require the non-diameter counterexample. O21 checks whether a proof degenerates when the midpoint equals the center. O22 must use the opposite-side condition, not an assumed sum for any two parallel chords. In O23 assess all four endpoint distances after the product check; a matching product alone is not the requested construction.

Core task

Two concentric circles have radii 13 and 10. A line is 5 units from their common center and intersects both circles. Find the full chord length in each circle and the length of each portion lying inside the larger circle but outside the smaller one. Explain why the two outer portions have equal lengths.

Teacher solution and discussion

The common perpendicular from the center to the line bisects both chords at the same midpoint. The larger half-chord is $\sqrt{169-25}=12$, so its full length is 24. The smaller half-chord is $\sqrt{100-25}=\sqrt{75}=5\sqrt{3}$, so its full length is $10\sqrt{3}$. Each outer portion is $12-5\sqrt{3}$, which is positive. Reflection across the common perpendicular exchanges the two portions, or subtraction from the shared midpoint gives the same value on each side.

Evidence and response

Use one shared midpoint, calculate both exact full chords and subtract half-lengths rather than mistakenly giving the combined outer length. Ask the learner to point to the calculation or representation supporting the claim. A selected option alone does not identify a unique misconception.

Closure: Ask learners to state one feature they verified and one check they used. Use the worked key for M19 to compare all alternatives after evidence is collected.

SMALL-GROUP RETEACH

Teaching script

Core: O24 • T3: Apply and derive radius, diameter, chord, tangent and secant length relationships, preserving whole-segment labels and positive-length domains.

Optional bank: M24–M27; O24–O27. Select tasks across more than one meeting if needed.

Suggested discussion/work time: 10–15 minutes. Adjust for access and evidence; this is not a speed criterion.

Choose O24 for external/interior/whole confusion, O25 for the false claim that a right angle and common hypotenuse force congruence, O26 for missing tangent-congruence hypotheses, or O27 for failure to compare line distance with radius. Preserve the initial response. Rebuild the specific needed diagram or proportion, then remove the model and collect a fresh explanation. Avoid prompting by simply naming the missing theorem.

Core task

A student uses $t^2 = 5 \cdot 7$ for a tangent-secant problem where the external secant part is 5 and the interior part is 7. Identify exactly what is mislabeled in that equation, write the correct equation, find the exact tangent length and compare it with the student's answer. Explain why the correct tangent is shorter than the whole secant.

Teacher solution and discussion

The factor 7 is the interior part, but the theorem needs the whole secant, $5 + 7 = 12$. The correct equation is $t^2 = 5 \cdot 12 = 60$, so $t = 2\sqrt{15}$. The student would obtain $\sqrt{35}$, an underestimate, because $35 < 60$. Since $0 < 5 < 12$, the product $5 \cdot 12$ is less than 12^2 ; taking positive square roots gives $2\sqrt{15} < 12$. Thus the tangent is shorter than the whole secant without needing a decimal approximation.

Evidence and response

Locate the exact missing portion, repair the equation and use ordered positive quantities to justify both comparisons. Ask the learner to point to the calculation or representation supporting the claim. A selected option alone does not identify a unique misconception.

Closure: Ask learners to state one feature they verified and one check they used. Use the worked key for M24 to compare all alternatives after evidence is collected.

EXIT TICKET

Teaching script

Core: O28 • T2: Determine and justify angle and arc measures using central, inscribed, tangent-chord, intersecting-chord, exterior-secant and circumscribed-angle relationships.

Optional bank: M28–M30; O28–O30. Select tasks across more than one meeting if needed.

Suggested discussion/work time: 5–8 minutes. Adjust for access and evidence; this is not a speed criterion.

For O28 require the arc type before transferring to tangents. O29 tests whether learners use cyclic order to defend the arc choice. O30 integrates chord bisection, right-triangle similarity and tangent verification in one actually feasible circle. Collect a claim, a named theorem with its hypotheses and an exact check before sharing the key.

Core task

An inscribed angle ACB measures 58 degrees. Determine the arc AB not containing C, explain why that arc is minor, and find angle APB between tangent segments PA and PB from their common exterior endpoint P. State which parts of the argument would change if the inscribed angle were obtuse.

Teacher solution and discussion

The intercepted arc is $2 \cdot 58 = 116$ degrees, so it is minor because it is less than 180. The angle between the two tangent segments is $180 - 116 = 64$ degrees. If the inscribed angle were obtuse, its intercepted arc would be major; one would first subtract that arc from 360 to find the minor arc before applying the tangent-pair supplement. The given 58-degree case needs no such arc switch.

Evidence and response

Transfer from inscribed angle to its identified arc and then to a circumscribed angle, explaining the minor/major decision rather than blindly reusing a supplement. Ask the learner to point to the calculation or representation supporting the claim. A selected option alone does not identify a unique misconception.

Closure: Ask learners to state one feature they verified and one check they used. Use the worked key for M28 to compare all alternatives after evidence is collected.

MULTIPLE-CHOICE BANK

M01 / M02 • Select and justify**M01 | Warm-up | T1**

In a circle with center O, A and B lie on the circle, and segment AB passes through O. Which statement correctly classifies the segments?

- A. OA is a radius; AB is both a diameter and a chord.
- B. OA is a chord; AB is a radius.
- C. AB is a diameter but cannot be a chord.
- D. Every chord of this circle must pass through O.

Reasoning: _____

M02 | Warm-up | T1

A nonreflex central angle AOB in a circle measures 132 degrees. What is the measure of the minor arc AB?

- A. 132 degrees.
- B. 66 degrees.
- C. 264 degrees.
- D. 228 degrees.

Reasoning: _____

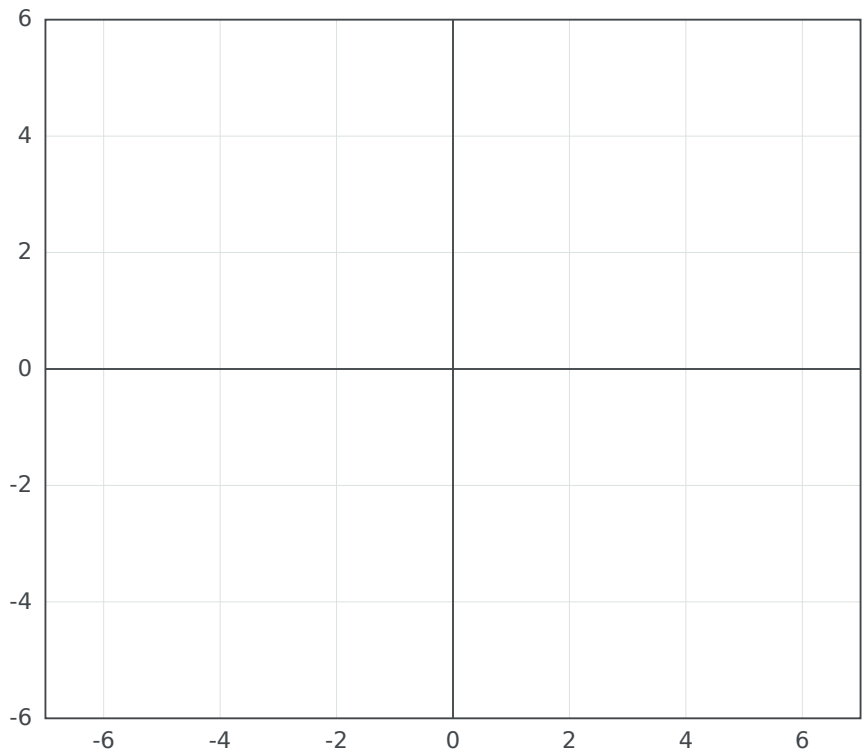
WARM-UP

001 • Show your reasoning

T1: Identify circle-related angles and segments and state the hypotheses that distinguish central, inscribed, circumscribed, chord, secant and tangent configurations.

On a coordinate grid, draw the circle centered at $O(0,0)$ with radius 4. Mark $A(-4,0)$, $B(4,0)$ and $C(0,4)$. Draw and label radius OC , diameter AB , non-diameter chord AC , the tangent line at C , and a secant line through A and B . Explain why the segment AB and its full line have different classifications.

vertical axis: _____



horizontal axis: _____

Explanation and check

WARM-UP

002 • Show your reasoning

T2: Determine and justify angle and arc measures using central, inscribed, tangent-chord, intersecting-chord, exterior-secant and circumscribed-angle relationships.

A circle centered at O has radii OA and OB with nonreflex angle $\text{AOB}=74$ degrees. Find the two base angles of triangle OAB and the degree measures of both arcs AB. Explain how the same diagram uses a triangle theorem and a circle theorem without confusing them.

Representation / calculation

Explanation / check

WORKED TEACHER KEYS

M01 / M02

M01 • T1: Identify circle-related angles and segments and state the hypotheses that distinguish central, inscribed, circumscribed, chord, secant and tangent configurations.

Answer: A. OA is a radius; AB is both a diameter and a chord.

A radius joins the center to the circle. A chord joins two points on the circle. A diameter is a chord through the center, so AB satisfies both chord and diameter definitions.

Check each alternative

- A. Correct. A radius joins the center to the circle. A chord joins two points on the circle. A diameter is a chord through the center, so AB satisfies both chord and diameter definitions.
- B. A chord has both endpoints on the circle, whereas O is the center, not a point on the circle.
- C. A diameter is a special chord, with the additional condition that it passes through the center.
- D. Only diameters are required to pass through the center; other chords need not.

Evidence to assess

Use endpoint locations and the through-center condition, and allow the two valid classifications of AB.

M02 • T1: Identify circle-related angles and segments and state the hypotheses that distinguish central, inscribed, circumscribed, chord, secant and tangent configurations.

Answer: A. 132 degrees.

The measure of a minor arc equals its nonreflex central angle. Thus minor arc AB is 132 degrees; the other arc is $360 - 132 = 228$ degrees.

Check each alternative

- A. Correct. The measure of a minor arc equals its nonreflex central angle. Thus minor arc AB is 132 degrees; the other arc is $360 - 132 = 228$ degrees.
- B. Halving an arc gives an inscribed angle, not its central angle.
- C. Doubling the central angle incorrectly treats it as an inscribed angle.
- D. Subtracting 132 from 360 gives the major arc, not the requested minor arc.

Evidence to assess

Match the central angle directly with its intercepted minor arc and distinguish the complementary major arc.

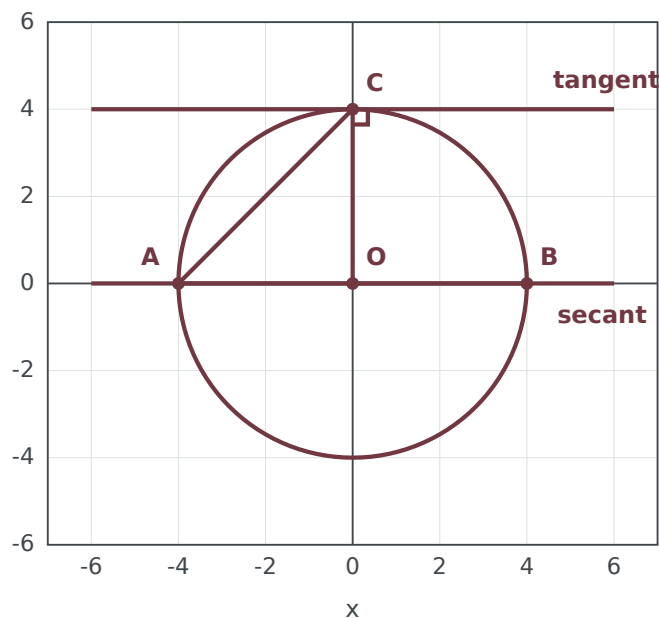
WORKED TEACHER KEYS

001

001 • T1: Identify circle-related angles and segments and state the hypotheses that distinguish central, inscribed, circumscribed, chord, secant and tangent configurations.

Draw the radius-4 circle, the x-axis as the full secant, and the horizontal line $y=4$ as the tangent at C. Segment OC has one endpoint at the center; segment AB has endpoints on the circle and passes through O; AC is a chord but does not pass through O. Mark OC perpendicular to $y=4$ at C. AB is a finite diameter segment, while its full line is a secant meeting the circle twice.

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Evidence to assess

Show all five requested objects, distinguish a full line from a segment, and mark the tangent-radius right angle at C.

WORKED TEACHER KEYS

002

002 • T2: Determine and justify angle and arc measures using central, inscribed, tangent-chord, intersecting-chord, exterior-secant and circumscribed-angle relationships.

Since $OA=OB$ are radii, triangle OAB is isosceles. Its base angles are equal and sum to $180-74=106$ degrees, so each is 53 degrees. The minor arc AB is 74 degrees by the central-angle definition, and the major arc is $360-74=286$ degrees. The 53-degree base angles do not intercept arc AB because their vertices are A and B . Extending a radius ray to the opposite point of the circle lets a base angle be viewed as an inscribed angle on a different arc, not on arc AB .

Evidence to assess

Use equal radii and the triangle sum for the base angles, then the central-angle rule for both arcs; explain why a base angle does not intercept arc AB .