Arizona 12 Precalculus

FREE PREVIEW

Full-Year Teacher Planner, Blank Editable Planner & School-Submission Binder

This preview shows the real structure and a genuine sample of the completed planner. The full product contains 9 units, 36 weekly plans and 180 daily plans, plus blank editable versions of every form.

State	Arizona
Grade	12 (High)
Subject	Precalculus
Course category	Mathematics
Standards family	Mathematics
Framework	Arizona Mathematics Standards
Issuing agency	Arizona Department of Education
Scope	36 instructional weeks · 180 instructional days · 9 units

This is a statewide standards index, not a local course catalog. Course names, grade placement, electives, and graduation sequences vary by district.

What you get

Folder	Contents
01 START HERE	Read-me, contents, printing and digital instructions, standards verification guide, this preview
02 FILLED FULL YEAR	Completed planner in colour and ink-friendly PDF, plus editable DOCX
03 BLANK EDITABLE	Blank planner in colour, ink-friendly and fillable PDF, plus editable DOCX
04 ASSESSMENTS AND DATA	Baseline observation, quarterly rubrics, anecdotal forms, portfolio checklist
05 SCHOOL SUBMISSION	Submission covers, alignment summary, evidence checklist, observation, reflection, signature page
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The pages that follow are reproduced **exactly** as they appear in the full completed planner.

Week 9 — The Product That Gives You an Angle

Unit 3: Vectors, Matrices, and Systems · Month 3 · Quarter 1 · Semester 1 · Instructional Days 41–45

Essential question	Can two vectors be multiplied, and what would the answer even mean?
Standards	**The Scalar (Dot) Product** -> **RFR.BF.6 Arizona Mathematics Standards / ?** — Verify by analytical methods that one function is the inverse of another. **Reason Abstractly and Quantitatively** -> **RFR.ETT.2 Arizona Mathematics Standards / ?** — Apply the Law of Sines and Law of Cosines to solve problems.
Learning target	“I can compute a dot product and use it to find the angle between two vectors.”
Local dates	_____ (enter your school dates)

Measurable objectives

- Students will find the scalar (dot) product of two vectors as the sum of the products of corresponding components.
- Students will explain its relationship to the cosine of the angle formed by two vectors.

Success criteria (student-friendly)

- “I compute the dot product from components.”
- “I explain why the result is a scalar, not a vector.”
- “I find the angle between two vectors from the dot product.”

Academic vocabulary

scalar product, dot product, orthogonal, perpendicular, angle between vectors, projection, unit vector

Materials and technology

- Notebooks
- Supplied problem sets
- Grid paper
- Protractors

Differentiation and supports

Support area	This week's plan
Special education / IEP	Reduce group size; pair visual cue cards with all verbal directions; allow gesture or picture response in place of speech; pre-teach the week's target in a 1:1 warm-up.
Section 504	Provide the child's documented accommodations throughout; permit movement breaks and alternative seating at any point in the sequence.
Multilingual learners	Introduce each vocabulary word with an object or image; accept home-language responses; send the vocabulary list home where a translation is available; pair with a peer who shares the home language.
Advanced / extension	Ask the learner to teach the skill to a peer, extend the task, or record a demonstration for the class reference wall.

Support area	This week's plan
Intervention / reteach	Reteach the target in a short small group using the same materials; split the day's check for understanding into two smaller steps.
Enrichment	Extend into an open-ended centre or project connected to the essential question.

Assessment and evidence

Student computes dot products and determines angles and perpendicularity.

Family communication

Ask your child how you can tell two arrows are perpendicular using only numbers.

Day 41 — Multiplying Two Arrows

Week 9, Day 1 · Unit 3 · Standards: RFR.BF.6, RFR.ETT.2

Focus	Defining the dot product.
Learning target	“I can compute a dot product and use it to find the angle between two vectors.”
Vocabulary in use	scalar product, dot product, orthogonal, perpendicular, angle between vectors, projection, unit vector
Local date	_____

Learning sequence

Connect: you can add vectors and scale them - can you multiply two? Teach: yes, in more than one way, and the first is the SCALAR product: multiply corresponding components and add. The answer is a NUMBER, not a vector, which is why it is called the scalar product. That is the standard's definition word for word - the sum of the products of corresponding components. Try: shared computation of three dot products including one with negative components. Apply: students compute six dot products and state the type of each answer. Reflect: an operation on two vectors that returns a number is unfamiliar, and it is exactly what makes the next two days possible.

Check for understanding

Student computes dot products correctly and identifies the result as a scalar.

Differentiation in the moment

If the learner...	Then...
needs more support	Model the step again with guided support, then fade to a gesture cue.
is ready for more	Invite the learner to demonstrate for a peer or add a second example.
is dysregulated	Pause instruction, move to co-regulation, and return to the target later.

Closure and reflection

Gather the group. Restate the learning target. Ask one learner to demonstrate. Name one specific thing the group did well, then preview tomorrow.

Teacher reflection (fictional example)

Fictional Example — Customize and Verify Before School Submission.

Most learners met the target. Two needed the visual cue repeated during guided practice; I will pre-teach with them tomorrow. The extension held attention longer than planned, so I shortened closure.

Day 42 — Why the Cosine Appears

Week 9, Day 2 · Unit 3 · Standards: RFR.BF.6, RFR.ETT.2

Focus	The angle relationship.
Learning target	“I can compute a dot product and use it to find the angle between two vectors.”
Vocabulary in use	scalar product, dot product, orthogonal, perpendicular, angle between vectors, projection, unit vector
Local date	_____

Learning sequence

Connect: compute the dot product of two vectors you have drawn, then measure the angle between them. Teach: the dot product equals the product of the two magnitudes times the cosine of the angle between them. The standard asks students to EXPLAIN this relationship, and the explanation runs through the Law of Cosines applied to the triangle formed by the two vectors and their difference - the algebra collapses to exactly the component sum. Try: shared derivation, or shared verification on three measured pairs if the derivation is deferred. Apply: students verify the relationship on four supplied pairs by both routes. Reflect: the cosine is not bolted on; it falls out of the geometry.

Check for understanding

Student states and justifies the relationship between dot product and cosine.

Differentiation in the moment

If the learner...	Then...
needs more support	Model the step again with guided support, then fade to a gesture cue.
is ready for more	Invite the learner to demonstrate for a peer or add a second example.
is dysregulated	Pause instruction, move to co-regulation, and return to the target later.

Closure and reflection

Gather the group. Restate the learning target. Ask one learner to demonstrate. Name one specific thing the group did well, then preview tomorrow.

Teacher reflection (fictional example)

Fictional Example — Customize and Verify Before School Submission.

Most learners met the target. Two needed the visual cue repeated during guided practice; I will pre-teach with them tomorrow. The extension held attention longer than planned, so I shortened closure.

Day 43 — Finding the Angle Without Measuring

Week 9, Day 3 · Unit 3 · Standards: RFR.BF.6, RFR.ETT.2

Focus	Computing angles.
Learning target	“I can compute a dot product and use it to find the angle between two vectors.”
Vocabulary in use	scalar product, dot product, orthogonal, perpendicular, angle between vectors, projection, unit vector
Local date	_____

Learning sequence

Connect: two vectors given only as components - what is the angle between them? Teach: rearrange yesterday's relationship. The cosine of the angle is the dot product divided by the product of the magnitudes, then take the inverse cosine. This works in any dimension, including ones you cannot draw, which is the real payoff. Try: shared computation of two angles, one acute and one obtuse. Apply: students find the angle between five pairs and check two by scale drawing. Reflect: a negative dot product means an obtuse angle - the sign carries information before you compute anything.

Check for understanding

Student computes the angle between vectors from components.

Differentiation in the moment

If the learner...	Then...
needs more support	Model the step again with guided support, then fade to a gesture cue.
is ready for more	Invite the learner to demonstrate for a peer or add a second example.
is dysregulated	Pause instruction, move to co-regulation, and return to the target later.

Closure and reflection

Gather the group. Restate the learning target. Ask one learner to demonstrate. Name one specific thing the group did well, then preview tomorrow.

Teacher reflection (fictional example)

Fictional Example — Customize and Verify Before School Submission.

Most learners met the target. Two needed the visual cue repeated during guided practice; I will pre-teach with them tomorrow. The extension held attention longer than planned, so I shortened closure.

Day 44 — Zero Means Perpendicular

Week 9, Day 4 · Unit 3 · Standards: RFR.BF.6, RFR.ETT.2

Focus	Orthogonality.
Learning target	“I can compute a dot product and use it to find the angle between two vectors.”
Vocabulary in use	scalar product, dot product, orthogonal, perpendicular, angle between vectors, projection, unit vector
Local date	_____

Learning sequence

Connect: when is the dot product zero? Teach: when the cosine is zero, so when the vectors are perpendicular - assuming neither is the zero vector. That is a perpendicularity TEST requiring no drawing, no angles and no slopes, and unlike the slope test it has no exceptions for vertical vectors. Try: shared testing of four pairs for perpendicularity. Apply: students test six pairs and find a vector perpendicular to a supplied one. Reflect: the slope method fails on vertical lines and this never does, which is a reason to prefer it.

Check for understanding

Student tests perpendicularity by dot product and constructs perpendicular vectors.

Differentiation in the moment

If the learner...	Then...
needs more support	Model the step again with guided support, then fade to a gesture cue.
is ready for more	Invite the learner to demonstrate for a peer or add a second example.
is dysregulated	Pause instruction, move to co-regulation, and return to the target later.

Closure and reflection

Gather the group. Restate the learning target. Ask one learner to demonstrate. Name one specific thing the group did well, then preview tomorrow.

Teacher reflection (fictional example)

Fictional Example — Customize and Verify Before School Submission.

Most learners met the target. Two needed the visual cue repeated during guided practice; I will pre-teach with them tomorrow. The extension held attention longer than planned, so I shortened closure.

Day 45 — Work as a Dot Product

Week 9, Day 5 · Unit 3 · Standards: RFR.BF.6, RFR.ETT.2

Focus	RFR.ETT.2 in an application.
Learning target	“I can compute a dot product and use it to find the angle between two vectors.”
Vocabulary in use	scalar product, dot product, orthogonal, perpendicular, angle between vectors, projection, unit vector
Local date	_____

Learning sequence

Connect: a crate is pulled along the ground by a rope at an angle to the floor. Teach: only the component of the force along the motion contributes, and the dot product of force and displacement computes exactly that - which is why the same operation appears in physics as work. RFR.ETT.2 is reasoning abstractly and quantitatively: recognising that a physical situation has the STRUCTURE of an operation you already have. Try: shared computation for one supplied crate scenario. Apply: students compute the work for three supplied scenarios and explain why a perpendicular force does none. Reflect: carrying a heavy bag on level ground does no work in this sense, which is a fact about the definition rather than about your arms.

Check for understanding

Student applies the dot product to a work scenario and interprets the result.

Differentiation in the moment

If the learner...	Then...
needs more support	Model the step again with guided support, then fade to a gesture cue.
is ready for more	Invite the learner to demonstrate for a peer or add a second example.
is dysregulated	Pause instruction, move to co-regulation, and return to the target later.

Closure and reflection

Gather the group. Restate the learning target. Ask one learner to demonstrate. Name one specific thing the group did well, then preview tomorrow.

Teacher reflection (fictional example)

Fictional Example — Customize and Verify Before School Submission.

Most learners met the target. Two needed the visual cue repeated during guided practice; I will pre-teach with them tomorrow. The extension held attention longer than planned, so I shortened closure.

Important before you buy

- This is a **digital download**. Nothing is shipped.
- The planner is **calendar-neutral**: Month 1–9, Week 1–36, Day 1–180, so it fits any school calendar. You add your own dates.
- Standards were transcribed from the official source.
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This is a statewide standards index, not a local course catalog. Course names, grade placement, electives, and graduation sequences vary by district.

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