

Newport-Mesa Unified School District
Office of Secondary Curriculum and Instruction
High School Course of Study

Course Title	Geometry	Course Code	M0420-421
---------------------	----------	--------------------	-----------

Transcript Title:	Geometry AB		Grades Levels:	9-12	Board Adoption Date:	6/23/2020	
Content Area:	Math		GPA Scale:	4.0	Date Course Submitted:	6/2000	
Credential Required:	Math	Graduation Subject Areas:		Math	CALPADS Code:	9255	
UC/CSU “A-G” Area Approvals:				School Site/person that wrote and submitted the course:		Ed Center/ Caroline Karr & Stephanie Marvicsin	
Recommend Skills:	1 ST through 8 th grade Math, Algebra 1						
Next course(s):	Algebra 2						
Textbook to be used:	Illustrative Mathematics, Geometry						

COURSE DESCRIPTION

For the first several units, students practice generating conjectures and observations. Students build on their middle school study of transformations of figures. Students use transformation-based definitions of congruence and similarity, allowing them to rigorously prove the triangle congruence and similarity theorems. They apply these theorems to prove results about quadrilaterals, isosceles triangles, and other figures. Students extend their understanding of similarity when they study right triangle trigonometry. Students derive volume formulas and study the effect of dilation on both area and volume. They connect ideas from algebra and geometry through coordinate geometry. They use transformations and the Pythagorean Theorem to build equations of circles, parabolas, parallel lines, and perpendicular lines from definitions, and they link transformations to the concept of functions. Students analyze relationships between segments and angles in circles and develop the concept of radian measure for angles. They close the year by extending what they learned about probability in grade 7 to consider probabilities of combined events, including identifying when events are independent. Within the classroom activities, students have opportunities to engage in aspects of mathematical modeling. Additionally, modeling prompts are provided for use throughout the course.

STANDARDS ADDRESSED

The Geometry course is designed around and informed by the following standards:

- *Common Core State Standards for Mathematics (June 2010)*

SUPPORTS AND EXTENSIONS

Supports for English Language Learners

Embedded within the curriculum are instructional supports and practices to help teachers address the specialized academic language demands in math when planning and delivering lessons, including the demands of reading, writing, speaking, listening, conversing, and representing in math (Aguirre & Bunch, 2012). The framework for supporting English language learners (ELLs) in this curriculum includes four design principles

Newport-Mesa Unified School District
Office of Secondary Curriculum and Instruction
High School Course of Study

Course Title	Geometry	Course Code	M0420-421
---------------------	----------	--------------------	-----------

(support sense-making, optimize output, cultivate conversation, and maximize meta-awareness) for promoting mathematical language use and development in curriculum and instruction. The design principles and related routines work to make language development an integral part of planning and delivering instruction while guiding teachers to amplify the most important language that students are expected to bring to bear on the central mathematical ideas of each unit.

Supports for Students with Disabilities

The additional supports for students with disabilities are activity-specific and provide teachers with strategies to increase access and eliminate barriers without reducing the mathematical demand of the task. Designed for students with disabilities, they are also appropriate for many students who need additional support to access rigorous, grade-level content. The additional supports for students with disabilities were designed using the Universal Design for Learning Guidelines (<http://udlguidelines.cast.org>). Each support aligns to one of the three principles of UDL: engagement, representation, and action and expression.

Extensions

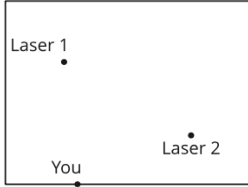
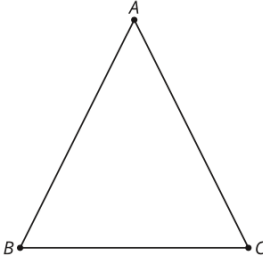
Select classroom activities include an opportunity for differentiation for students ready for more of a challenge. Every extension problem is made available to all students with the heading "Are You Ready for More?" These problems go deeper into grade-level mathematics and often make connections between the topic at hand and other concepts. They are intended to be used on an opt-in basis by students if they finish the main class activity early or want to do more mathematics on their own.

EVALUATION

Student achievement will be measured using multiple assessment tools, included but not limited to check-your-readiness pre-assessments, mid-unit assessments, end-of-unit assessments, lesson activities, practice problems, and cool-downs.

Newport-Mesa Unified School District
Office of Secondary Curriculum and Instruction
High School Course of Study

Course Title	Geometry	Course Code	M0420-421
---------------------	----------	--------------------	-----------

Unit 1: Constructions and Rigid Transformations		
Unit Overview	Model Assignments	California State Content Standards Covered in this Unit
In grade 8, students determine the angle-preserving and length-preserving properties of rigid transformations experimentally, mostly with the help of a coordinate grid. In this unit, students create rigid motions using construction tools with no coordinate grid. This leads to more rigorous definitions of rotations, reflections, and translations. In previous courses, students developed their understanding of the concept of functions. In this unit, the concept of a transformation is made somewhat more formal using the language of functions. Constructions play a significant role in the logical foundation of geometry. A focus of this unit is for students to explore properties of shapes in the plane without the aid of given measurements. Constructions are used throughout several lessons to introduce students to reasoning about distances, generating conjectures, and attending to the level of precision required to define rigid motions later in the unit. The definition of a circle is an important foundation for concepts in this unit and throughout the course. Then, students learn rigorous definitions of rigid motions without reference to a coordinate grid. In subsequent units, they use those definitions to prove theorems. In the final lessons of the unit,	Lesson 3: Construction Techniques 1: Perpendicular Bisectors Cool Down: Walk the Line Here is a hallway with lasers:  Imagine that you must cross the hallway while staying an equal distance from each laser. If you get closer to one laser than the other, it will blast you. Use a compass and straightedge to draw a safe path through the hallway. Lesson 7: Construction Techniques 5: Squares Cool Down: Build a House Use compass and straightedge moves to construct a square with segment BC as one of the sides. 	HSG-CO.A.1 HSG-CO.A.2 HSG-CO.A.3 HSG-CO.A.4 HSG-CO.A.5 HSG-CO.B.6 HSG-CO.C HSG-CO.C.10 HSG-CO.C.9 HSG-CO.D.12 HSG-CO.D.13 HSG-MG.A.1 HSG-MG.A.3 HSN-Q.A.1 HSN-Q.A.2 HSN-Q.A.3

Newport-Mesa Unified School District
Office of Secondary Curriculum and Instruction
High School Course of Study

Course Title	Geometry	Course Code	M0420-421
--------------	----------	-------------	-----------

students learn ways to express their reasoning more formally. Students create conjectures about angle relationships and prove them using what they know about rigid transformations.

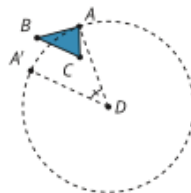
Lesson 14: Defining Rotations

Cool Down: What Went Wrong? Rotation

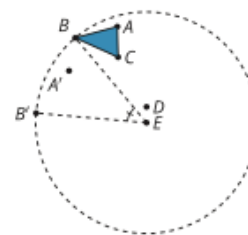
Andre tried to rotate triangle ABC 45 degrees counterclockwise. He knows something went wrong because the image doesn't seem to be congruent to the original figure.

1. What is one idea that Andre probably understands about rotations?
2. What is one idea that Andre doesn't understand about rotations?
3. Rotate triangle ABC by 45 degrees counterclockwise, avoiding Andre's mistake.

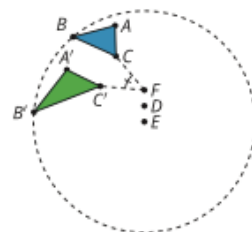
Andre Step 1



Andre Step 2



Andre Step 3



Your Turn



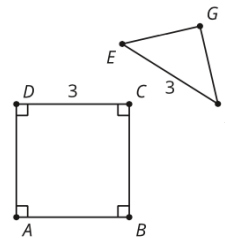
Newport-Mesa Unified School District
Office of Secondary Curriculum and Instruction
High School Course of Study

Course Title	Geometry	Course Code	M0420-421
---------------------	----------	--------------------	-----------

Lesson 18: Practicing Point by Point Transformations

Cool Down: Build Another House

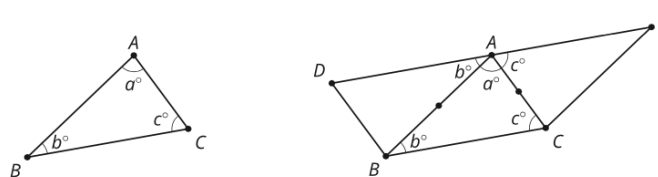
Find a sequence of translations, rotations, and reflections that transform triangle EFG so that its image rests on square $ABCD$ to together form a simple drawing of a house.



Lesson 21: One Hundred and Eighty

Cool Down: Triangle Angle Sum a Third Way

Elena wants to prove that the measures of the 3 angles in a triangle always sum to 180 degrees. She starts by using rigid motions to rotate triangle ABC 180 degrees around 2 midpoints.

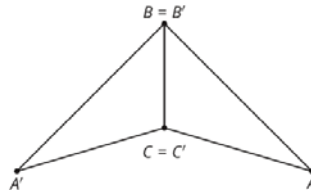
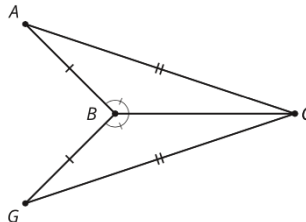


Explain how Elena labeled her diagram and finish her proof.

Unit 2: Congruence

Unit Overview	Model Assignments	California State Content Standards Covered in this Unit
----------------------	--------------------------	--

Newport-Mesa Unified School District
Office of Secondary Curriculum and Instruction
High School Course of Study

Course Title	Geometry	Course Code	M0420-421
Before starting this unit, students are familiar with rigid transformations and congruence from grade 8. In this unit, rigid transformations are used to justify the triangle congruence theorems of Euclidean geometry: Side-Side-Side Triangle Congruence, Side-Angle-Side Triangle Congruence, and Angle-Side-Angle Triangle Congruence. Students justify that for each set of criteria, a sequence of rigid motions exist that will take one triangle onto the other. Students learn to explain how two triangles with all three pairs of corresponding side lengths congruent can be taken onto one another using a more general sequence of rigid motions. Students will justify how they know that a given sequence of transformations will result in the vertices coinciding. At first, students may use imprecise language to convey this and other ideas. Throughout the unit they will read examples, practice explaining ideas to a partner, and build a reference of precise statements to use in future proofs. Students also get the opportunity to immediately apply theorems they have proven to new contexts in which those theorems help them prove new results.	Lesson 1: Congruent Parts, Part 1 Cool Down: Making Angle Bisectors  Triangle $A'B'C'$ is a reflection of triangle ABC across line BC. Prove that ray BC is the angle bisector of angle ABA'. Lesson 3: Congruent Triangles, Part 1 Cool Down: Reflecting on Proof $\overline{AB} \cong \overline{BG}$, $\overline{AC} \cong \overline{GC}$, $\angle ABC \cong \angle GBC$  - What rigid transformation will take triangle GBC onto triangle ABC? - Explain why G' will coincide with A.	HSG-CO.A.1 HSG-CO.A.3 HSG-CO.A.5 HSG-CO.B.6 HSG-CO.B.7 HSG-CO.B.8 HSG-CO.C.10 HSG-CO.C.11 HSG-CO.C.9 HSG-GMD.A.3 HSG-MG.A.1 HSG-MG.A.3 HSG-SRT.A.3 HSN-Q.A.1 HSN-Q.A.2 HSN-Q.A.3	

Newport-Mesa Unified School District
Office of Secondary Curriculum and Instruction
High School Course of Study

Course Title	Geometry	Course Code	M0420-421
---------------------	----------	--------------------	-----------

	Lesson 5: Points, Segments, and Zigzags Cool Down: Circular Logic Conjecture: Any 2 circles in the plane are congruent. Do you agree or disagree with the conjecture? If you agree, explain how you know. If you disagree, edit the conjecture so it will always be true. Lesson 8: The Perpendicular Bisector Theorem Cool Down: Reflect and Revise Use your partner's feedback to write a final draft of your proof that if P is a point on the perpendicular bisector of AB, the distance from P to A is the same as the distance from P to B. Lesson 12: Proofs about Quadrilaterals Cool Down: A Proof In Time Saves Nine Elena wants to prove that a quadrilateral with 4 right angles must have congruent opposite sides. Explain to Elena how she can use the fact that all rectangles are parallelograms in her proof. Lesson 15: Congruence for Quadrilaterals Cool Down: Rectangles are Special Side-Side Rectangle Congruence Theorem: If we know 2 corresponding pairs of adjacent sides are congruent in a pair of rectangles, then the rectangles must be congruent. Explain how you know the Side-Side Rectangle Congruence Theorem must be true.	
--	---	--

Unit 3: Similarity		
Unit Overview	Model Assignments	California State Content Standards Covered in this Unit

Newport-Mesa Unified School District
Office of Secondary Curriculum and Instruction
High School Course of Study

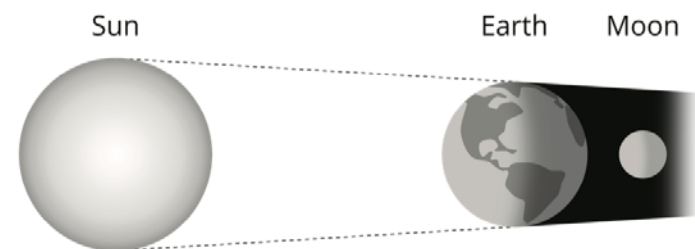
Course Title	Geometry	Course Code	M0420-421
--------------	----------	-------------	-----------

Before starting this unit, students are familiar with dilations and similarity from work in grade 8. In a previous unit, students used rigid transformations to justify the triangle congruence theorems of Euclidean geometry: Side-Side-Side Triangle Congruence Theorem, Side-Angle-Side Triangle Congruence Theorem, and Angle-Side-Angle Triangle Congruence Theorem. In this unit, students use dilations and rigid transformations to justify triangles are similar. They also draw conclusions about figures they've proven to be similar: in similar figures, corresponding angles are congruent and corresponding sides are in a proportional relationship. The unit balances a focus on proof with a focus on using similar triangles to find unknown side lengths and angle measurements. Early in the unit, students prove theorems using rigid transformations and dilations. Later in the unit, students use similarity shortcuts, especially the Angle-Angle Triangle Similarity Theorem, to justify that triangles must be similar and to find unknown side lengths using the fact that side lengths in similar figures are in the same proportion. This unit previews many of the important concepts that students rely on to make sense of trigonometry in later units.

Lesson 2: Scale of the Solar System

Cool Down: Watching a Solar Eclipse on the Moon

NOT TO SCALE



The Moon orbits Earth at 384,400 km. The distance from Earth to the Sun is 149,600,000 km. The diameter of the Sun is 1,391,000 km.

What would the diameter of Earth have to be to appear the same size as the Sun from the Moon if the celestial objects are in the order shown here?

Lesson 6: Connecting Similarity and Transformations

Cool Down: Forward and Backwards?

Determine if each statement must be true, could possibly be true, or definitely can't be true. Explain or show your reasoning.

1. Congruent figures are similar.

2. Similar figures are congruent.

HSA-CED.A.4

HSG-C.A

HSG-C.A.1

HSG-CO.A.2

HSG-CO.C.10

HSG-MG.A.1

HSG-MG.A.2

HSG-MG.A.3

HSG-SRT.A.1

HSG-SRT.A.1.a

HSG-SRT.A.1.b

HSG-SRT.A.2

HSG-SRT.A.3

HSG-SRT.B.4

HSG-SRT.B.5

HSG-SRT.C.6

HSG-SRT.C.8

HSN-Q.A.1

HSN-Q.A.3

Newport-Mesa Unified School District
Office of Secondary Curriculum and Instruction
High School Course of Study

Course Title	Geometry	Course Code	M0420-421
---------------------	----------	--------------------	-----------

Lesson 9: Conditions for Triangle Similarity

Cool Down: Any Four Angles?

Priya noticed in the last activity that between the 2 triangles, you only need to know 4 angles to show that they are similar. She wondered which fourth angle would work to prove that triangle RST is similar to triangle EFG .

In triangle RST :

- Angle R is 90°
- Angle S is 25°
- Angle T is x°

In triangle EFG :

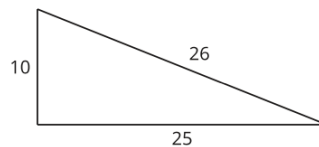
- Angle E is 90°
- Angle F is y°
- Angle G is z°

Draw a sketch of the triangles. Then pick one angle measurement that would prove the triangles are similar. Explain to Priya why knowing that angle would be enough.

Lesson 14: Proving the Pythagorean Theorem

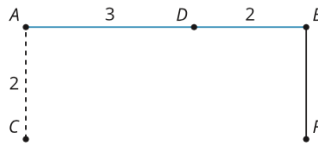
Cool Down: Test it Out

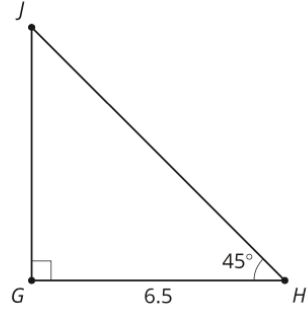
Is this triangle a right triangle? Explain.



Newport-Mesa Unified School District
Office of Secondary Curriculum and Instruction
High School Course of Study

Course Title	Geometry	Course Code	M0420-421
---------------------	----------	--------------------	-----------

	Lesson 16: Bank Shot Cool Down: What's in the Mirror? Wall AB is covered in a mirror. If you stand at point C and look at point D, what point on wall BF will you see in the mirror? Label the point E and determine the distance from B to E. 	
--	---	--

Unit 4: Right Triangle Trigonometry		
Unit Overview	Model Assignments	California State Content Standards Covered in this Unit
Prior to beginning this unit students will have considerable familiarity with right triangles. The first few lessons of this unit examine some special cases of similar right triangles to solidify the idea that any right triangles with a single congruent acute angle are similar. From there students generate data for the side length ratios of many sets of right triangles. This data is organized into a table which students apply to problems. Taking the time to both build and use the table helps students build a solid foundation before they learn the names of trigonometric ratios. Once students have practiced estimating both side lengths and angle measures using the table, they learn the names cosine, sine, and tangent. Several concepts build	Lesson 2: Half a Square Cool Down: Another Half Square Calculate the lengths of the 2 unlabeled sides. 	HSG-GMD.A.1 HSG-MG.A.1 HSG-MG.A.3 HSG-SRT.B.5 HSG-SRT.C HSG-SRT.C.6 HSG-SRT.C.7 HSG-SRT.C.8 HSN-Q.A.2 HSN-Q.A.3

Newport-Mesa Unified School District
Office of Secondary Curriculum and Instruction
High School Course of Study

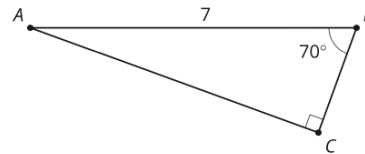
Course Title	Geometry	Course Code	M0420-421
---------------------	----------	--------------------	-----------

throughout the unit. Students notice patterns between the columns for cosine and sine before they even learn the names cosine and sine. In a subsequent lesson they investigate that relationship, proving the two ratios are equal for complementary angles. Finding the measures of acute angles in a right triangle follows a similar arc, where students first use the table to estimate and then in a subsequent lesson learn how to calculate an angle measure given the side measures by using arcsine, arccosine, and arctangent.

Lesson 5: Working with Ratios in Right Triangles

Cool Down: Solve the Triangle

Find all the missing sides and angles of this triangle.



Lesson 7: Applying Ratios in Right Triangles

Cool Down: Tallest Tree

The tallest tree in the world is a redwood in California (as of April 2019).

If you're standing on the trail 220 feet from the bottom of the tree, you have to look up at a 60 degree angle to see the top. How tall is the tree?

Lesson 8: Sine and Cosine in the Same Right Triangle

Cool Down: Cosine's Complement

Find the value or expression for θ .

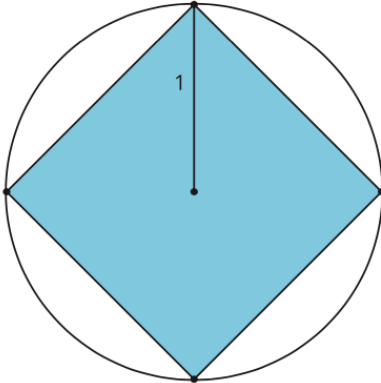
1. $\sin(55) = \cos(\theta)$

2. $\sin(\theta) = \cos(28)$

3. $\cos(y) = \sin(\theta)$

Newport-Mesa Unified School District
Office of Secondary Curriculum and Instruction
High School Course of Study

Course Title	Geometry	Course Code	M0420-421
--------------	----------	-------------	-----------

	Lesson 10: Solving Problems with Trigonometry Cool Down: Again with Area What is the area of a square inscribed in a circle with radius 1 meter? 	
--	--	--

Unit 5: Solid Geometry		
Unit Overview	Model Assignments	California State Content Standards Covered in this Unit

Newport-Mesa Unified School District
Office of Secondary Curriculum and Instruction
High School Course of Study

Course Title	Geometry	Course Code	M0420-421
--------------	----------	-------------	-----------

In previous grades, students solved problems involving area, surface area, and volume for various solids. In this unit, students practice spatial visualization in three dimensions, study the effect of dilation on area and volume, derive volume formulas using dissection arguments and Cavalieri's Principle, and apply volume formulas to solve problems involving surface area to volume ratios, density, cube roots, and square roots. Students first practice spatial visualization by examining solids of rotation, envisioning these solids by rotating paper figures using a pencil as an axis of rotation. Then they investigate cross sections of a variety of solids. Then, students extend their study of scaling to solids. The unit then builds on students' prior knowledge about volumes of prisms to introduce Cavalieri's Principle. Students now combine concepts of dilations, cross sections, and Cavalieri's Principle with dissection to derive the formula for the volume of a pyramid or cone. Next, students consider a general pyramid, and compare it to a triangular pyramid with equal height and a base of equal area. In the final lessons, students apply what they know about volume to solve problems.

Lesson 1: Solids of Rotation

Cool Down: Telescope

Draw a two-dimensional shape together with an axis of rotation that would produce the telescope in the image.



Lesson 5: Scaling and Unscaling

Cool Down: Miniature

A toy train set includes a train station building which is a scale model of a real building. The area of the front side of the toy building is 1 square foot. The real building's front side has an area of 400 square feet. If we view the real building as a dilation of the toy, what is the scale factor?

Lesson 9: Cylinder Volumes

Cool Down: Cylinder Strategies

Three students calculated the volume of a cylinder. Each used a different strategy.

- Jada said, "I used the formula $V = Bh$."
- Andre said, "I found the area of a circular cross section and multiplied it by the cylinder's height."
- Han said, "I used the formula $V = \pi r^2 h$."

For each student, decide if you agree with their strategy. Explain your reasoning.

HSA-CED.A.2
HSA-SSE.A.1.a
HSA-SSE.A.1.b
HSF-IF.C.7.b
HSG-GMD
HSG-GMD.A.1
HSG-GMD.A.3
HSG-GMD.B.4
HSG-MG.A.1
HSG-MG.A.2
HSG-MG.A.3
HSG-SRT.C.8
HSN-Q.A.1

Newport-Mesa Unified School District
Office of Secondary Curriculum and Instruction
High School Course of Study

Course Title	Geometry	Course Code	M0420-421
---------------------	----------	--------------------	-----------

Lesson 10: Cross Sections and Volume

Cool Down: Drawing Solids

Draw two solids that are not identical but that have the same volume.

Lesson 15: Putting All the Solids Together

Cool Down: Maximizing Seeds

A shop sells 2 brands of sunflower seeds. Brand A's package is in the shape of a cone with radius 2.5 centimeters and height 10 centimeters. Brand B's package is in the shape of a square prism. The prism's height is 2.5 centimeters, and each side of the base measures 5 centimeters.

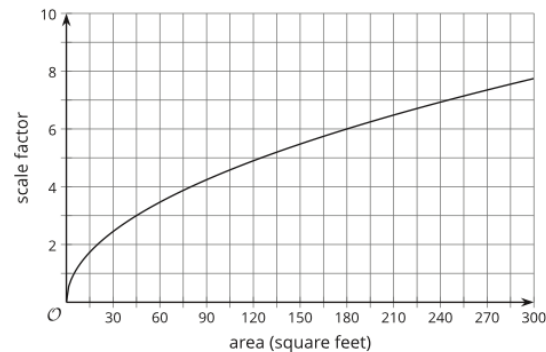
Which package contains more seeds? Explain or show your reasoning.

Lesson 18: Volume and Graphing

Cool Down: Circular Logo

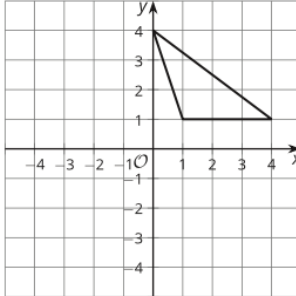
A company's circular logo, printed on a poster, has a radius of 1.25 feet and an area of about 5 square feet. The logo is being scaled up so it can be painted on a billboard. The equation $k = \sqrt{\frac{A}{5}}$ shows the scale factor, k , that is needed to achieve an area A . A graph of the equation is shown.

The company has 240 square feet worth of paint. If they want to use all their paint, approximately what scale factor should they apply to the logo, and what will the dilated logo's radius be?



Newport-Mesa Unified School District
Office of Secondary Curriculum and Instruction
High School Course of Study

Course Title	Geometry	Course Code	M0420-421
---------------------	----------	--------------------	-----------

Unit 6: Coordinate Geometry		
Unit Overview	Model Assignments	California State Content Standards Covered in this Unit
Prior to beginning this unit, students will have spent most of the course studying geometric figures not described by coordinates. However, students have seen figures on the grid (notably transformations in grade 8) as well as lines and curves on the coordinate plane (in previous courses). This unit brings together students' experience from previous years with their new understanding from this course for an in-depth study of coordinate geometry. The first few lessons examine transformations in the plane. Students encounter a new coordinate transformation notation which connects transformations to functions. The next set of lessons focuses on building equations from definitions. Students examine circles and parabolas through the lens of distance. The unit progresses next to coordinate proof. At the end of the unit, students use weighted averages to partition segments, scale figures, and locate the intersection points of the medians of a triangle. In the final lesson, students locate the intersection points of the altitudes of a triangle.	Lesson 3: Types of Transformations Cool Down: Write a Rule  1. Write a rule that will take the triangle to a congruent triangle. You do not need to carry out the transformation. 2. Write a rule that will take the triangle to a figure that is not congruent. You do not need to carry out the transformation. Lesson 5: Squares and Circles Cool Down: Center and Radius Find the center and radius of the circle with this equation: $x^2 + 16x + 64 + y^2 - 2y + 1 = 144$	HSA-CED.A.2 HSA-CED.A.4 HSA-REI.C.7 HSA-SSE.A HSA-SSE.A.1.a HSA-SSE.A.2 HSA-SSE.B.3 HSG-CO.A.1 HSG-CO.A.2 HSG-CO.A.5 HSG-CO.B HSG-GPE.A.1 HSG-GPE.A.2 HSG-GPE.B.4 HSG-GPE.B.5 HSG-GPE.B.7 HSG-SRT.B.5 HSN-Q.A.1

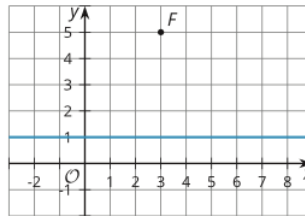
Newport-Mesa Unified School District
Office of Secondary Curriculum and Instruction
High School Course of Study

Course Title	Geometry	Course Code	M0420-421
---------------------	----------	--------------------	-----------

Lesson 7: Distances and Parabolas

Cool Down: A Point and a Line

The image shows a point and a line. Suppose we create a parabola using the point as the focus and the line as the directrix. Decide whether each point on the list is on this parabola. Explain your reasoning.



1. $(-1, 5)$

2. $(3, 3)$

3. $(5, 5)$

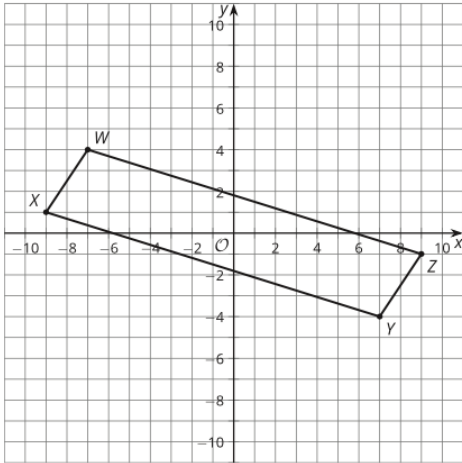
Lesson 11: Perpendicular Lines in the Plane

Cool Down: Another Perpendicular Line

Write an equation of the line that passes through $(-4, 1)$ and is perpendicular to the line $y = 2x + 3$.

Newport-Mesa Unified School District
Office of Secondary Curriculum and Instruction
High School Course of Study

Course Title	Geometry	Course Code	M0420-421
---------------------	----------	--------------------	-----------

	Lesson 14: Coordinate Proof Cool Down: Name That Quadrilateral Diego claims that he can tell, using slopes, that this quadrilateral is a parallelogram. Noah looks at the slopes Diego calculated and says he could be even more specific and call it a rectangle. Do you agree with either of them? Explain or show your reasoning. 	
--	--	--

Unit 7: Circles		
Unit Overview	Model Assignments	California State Content Standards Covered in this Unit

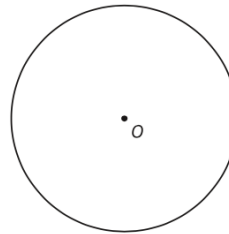
Newport-Mesa Unified School District
Office of Secondary Curriculum and Instruction
High School Course of Study

Course Title	Geometry	Course Code	M0420-421
--------------	----------	-------------	-----------

In grade 7, students used formulas for the area and circumference of a circle to solve problems. Earlier in this course, students made formal geometric constructions, studied similarity and proportional reasoning, and proved theorems about lines and angles. This unit builds on these skills and concepts to investigate the geometry of circles more closely. Students begin by defining the terms *chord*, *arc*, and *central angle*, and they use their new vocabulary to write a proof about congruent chords in circles. Next, students connect their findings about inscribed angles to cyclic quadrilaterals, or quadrilaterals which can be circumscribed by a circle. This leads to an exploration of circumscribed circles of triangles. The next section begins with students developing methods for calculating sector areas and arc lengths. Students explore the relationship between arc length and the radius of a circle, noting that because all circles are similar, the ratio of arc length to radius is invariant for a given central angle. This leads to the definition of the radian measure of a central angle as the quotient of the length of the arc defined by the angle and the radius of the circle. Students develop fluency with radian measures by shading portions of circles and working with a double number line. This is important for the transition towards Algebra 2. In that course, students will explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers,

Lesson 1: Lines, Angles, and Curves

Cool Down: Draw It



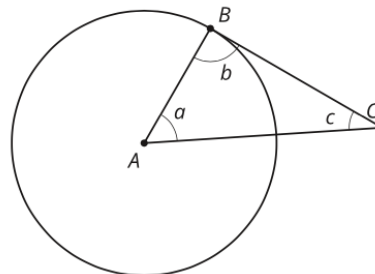
In the circle, draw each of the following.

1. a chord AB that is not a diameter
2. points C and D such that an arc from C to D measures about 120 degrees
3. central angle EOF that measures about 45 degrees

Lesson 3: Tangent Lines

Cool Down: Tangents and Triangles

Line BC is tangent to the circle.



What is the value of $a + c$? Explain or show your reasoning.

HSA-CED.A.2
HSA-SSE.A.1
HSA-SSE.A.1.b
HSG-C.A.2
HSG-C.A.3
HSG-C.B
HSG-C.B.5
HSG-CO.C.10
HSG-CO.C.9
HSG-GMD.A.1
HSG-MG.A.3
HSG-SRT.B.5
HSG-SRT.C.8

Newport-Mesa Unified School District
Office of Secondary Curriculum and Instruction
High School Course of Study

Course Title	Geometry	Course Code	M0420-421
---------------------	----------	--------------------	-----------

interpreted as radian measures of angles traversed counterclockwise around the unit circle.
In the final lesson, students apply what they have learned about circles to solve problems in context.

Lesson 5: Triangles in Circles

Cool Down: Fair Placement

The points A , B , and C show the location of 3 small towns.



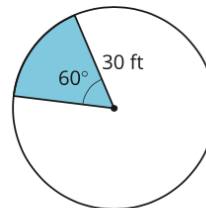
The towns are putting their resources together to build a school that they will all share. The residents want the school to be the same distance away from each town.

1. Use a straightedge to draw triangle ABC .
2. Find the location of a point D that is the same distance away from each town.

Lesson 8: Arcs and Sectors

Cool Down: Use Your Method

The image shows a circle with a shaded sector.



1. Find the area of the shaded sector.
2. Find the length of the arc defined by the sector.

Newport-Mesa Unified School District
Office of Secondary Curriculum and Instruction
High School Course of Study

Course Title	Geometry	Course Code	M0420-421
---------------------	----------	--------------------	-----------

	Lesson 12: Radian Sense Cool Down: Order Up Put these angle measures in order from smallest to largest: 180 degrees, 45 degrees, 6 radians, $\frac{5\pi}{6}$ radians, $\frac{\pi}{3}$ radians, 2π radians	
--	--	--

Unit 8: Probability		
Unit Overview	Model Assignments	California State Content Standards Covered in this Unit
In grade 7, students learned about probability by conducting chance experiments. Along with looking at experimental data, students created and analyzed sample spaces for situations. In this unit, students extend that knowledge by considering situations with two events, for example: roll a number cube and flip a coin. Students find probabilities when events are combined in various ways including both occurring, at least one occurring, and one event happening under the condition that the other happens as well. The unit begins with students creating different models for understanding sample spaces and probability. The models include tables, trees, lists, and Venn diagrams. Conditional probability is discussed and applied using several games and connections to everyday situations. The unit closes with students making conjectures about the independence of events when playing games with one another, then testing those conjectures by	Lesson 1: Up to Chance Cool Down: What Affects Probability? Match the description of the events to the most likely probability for that event to happen. 1. A short children's book is opened to a random page; the probability that the page is numbered something between 1 and 10. 2. A long novel is opened to a random page; the probability that the page is numbered something between 21 and 31. 3. A long history book is opened to a random page; the probability that the page is numbered something between 1 and 100. 4. A dictionary is opened to a random page; the probability that the page is numbered 103. A. $\frac{100}{433}$ B. $\frac{10}{17}$ C. $\frac{10}{433}$ D. $\frac{1}{645}$	HSS-CP.A.1 HSS-CP.A.2 HSS-CP.A.3 HSS-CP.A.4 HSS-CP.A.5 HSS-CP.B.6 HSS-CP.B.7 HSS-ID.B.5

Newport-Mesa Unified School District
Office of Secondary Curriculum and Instruction
High School Course of Study

Course Title	Geometry	Course Code	M0420-421
---------------------	----------	--------------------	-----------

collecting data and analyzing the results.

Lesson 4: Tables of Relative Frequencies

Cool Down: School Attendance

A district is interested in attendance for students in middle and high school. The results for one day are summarized in the table.

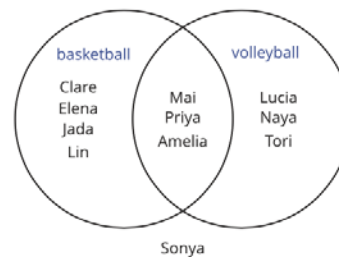
	students present	students absent	total
middle school	8,632	1,276	9,908
high school	10,563	2,118	12,681
total	19,196	3,394	22,589

1. If a student's name is selected at random, what is the probability that they are a middle school student who was present?
2. If high school student's name is selected at random, what is the probability that they were absent on that day?
3. If a student who was present that day is selected at random, what is the probability that they are in middle school?

Lesson 5: Combining Events

Cool Down: Playing Sports

A physical education teacher creates a Venn diagram displaying the sports played by several students. One of these students is selected at random.



1. What is the probability that it is a student who played basketball and volleyball?
2. What is the probability that it is a student who played basketball or volleyball?
3. What is the probability that it is not a student who played volleyball?

Newport-Mesa Unified School District
Office of Secondary Curriculum and Instruction
High School Course of Study

Course Title	Geometry	Course Code	M0420-421
---------------------	----------	--------------------	-----------

	Lesson 8: Conditional Probability Cool Down: Soccer Games A soccer team has two games in two days against different teams. Let A represent the event “the soccer team wins the first game” and B represent the event “the soccer team wins the second game.” 1. Describe the meaning of $P(B \mid A)$. 2. Do you think A and B are independent events? Explain your reasoning. 3. If the events are independent, how are $P(B \mid A)$ and $P(B)$ related?	
--	--	--