Mathematics Assessment
Updates for 2012

End-of-Course
High School Proficiency Exams

Table of Contents

Introduction

Updates for 2012 contains pertinent information for Washington educators. This document includes a summary of changes and new information in mathematics assessment, links to resources for teachers, and sample test items. *Updates for 2012* has been customized into grade bands: Grades 3-5, Grades 6-8, and End-of-Course Exams. The documents are available on http://www.k12.wa.us/Mathematics/default.aspx.

End-of-Course Exam Development Information

Washington State K-12 Mathematics Learning Standards

In 2008, the State Board of Education voted to approve the revised K-8 Mathematics Learning Standards and 9-12 Mathematics Learning Standards for adoption by the Office of Superintendent of Public Instruction (OSPI). Along with the new standards, the legislature provided direction for the redesign of the assessment system. The Measurements of Student Progress (MSP) replaced the Washington Assessment of Student Learning (WASL) and assessed the new mathematics standards in grades 3-8 starting in the spring of 2010. End-of-course (EOC) exams replaced the High School Proficiency Exam (HSPE) starting in 2011. These EOC exams assess the Algebra 1/Integrated Mathematics 1 and Geometry/Integrated Mathematics 2 performance expectations.

View the Washington State K-12 Mathematics Learning Standards at:
http://www.k12.wa.us/Mathematics/Standards.aspx

Test and Item Specifications

The Test and Item Specifications provide guidelines for developing large-scale assessments based on the Washington State K-12 Mathematics Learning Standards that assess the levels of proficiency students have achieved.

The test specifications provide a grade-level or course test map that delineates the type and number of test items in each Area of Emphasis.

The Test and Item Specifications are periodically updated. Included with each updated version of the Test and Item Specifications will be a summary of the changes made since the previous version. Updates made to the Test and Item Specifications do not indicate changes to which standards (performance expectations) are being assessed; the test content and test map remain the same. The updates address questions from educators requesting clarification of performance expectation scope and/or limitation. The Test and Item Specifications can be accessed through the following link:
http://www.k12.wa.us/Mathematics/TestItemSpec.aspx.

Vocabulary Excel Workbook

The vocabulary lists used in each course have been moved from the Test and Item Specifications to a separate Excel workbook. There are three worksheets in the vocabulary workbook.

1. MSP: First Used in Assessment Items
2. EOC: First Used in Exam Items
3. Not Used: Not used in Assessment Items

The Vocabulary Excel Workbook can be accessed through the following link: http://www.k12.wa.us/Mathematics/pubdocs/MathAssessmentVocabulary.xls.

Performance Level Descriptors

Performance Level Descriptors (PLDs) give teachers, parents/guardians and students more information about the typical skills and knowledge a student demonstrates on state assessments in each performance level. Committees of Washington state teachers, parents, community members and business representatives develop the Performance Level Descriptors during the standard setting process.

PLDs are broken down by the score levels students can earn:

- Basic (Level 2)
- Proficient (Level 3)
- Advanced (Level 4)

NOTE: There are no PLDs for Below Basic (Level 1).

End-of-course PLDs for the Year 1 and Year 2 EOC exams can be downloaded at http://www.k12.wa.us/assessment/StateTesting/PLD/default.aspx.

End-of-Course Information

End-of-Course Crosswalks

The purpose of these crosswalks is to identify the standards that are assessed on each end-of-course exam. For each course, the crosswalk identifies the performance expectations that are assessed for purposes of meeting graduation requirements, the performance expectations that are assessed for purposes of reporting student strength/weakness but are not used for purposes of graduation, and the performance expectations that are not assessed on either the end-of-course exams or the end-of-course retake exams.

Algebra 1
Available at: http://www.k12.wa.us/Mathematics/pubdocs/Algebra1Crosswalk.pdf

Geometry
Available at: http://www.k12.wa.us/Mathematics/pubdocs/GeometryCrosswalk.pdf

Integrated Mathematics 1
Available at: http://www.k12.wa.us/Mathematics/pubdocs/Math1Crosswalk.pdf

Integrated Mathematics 2
Available at: http://www.k12.wa.us/Mathematics/pubdocs/Math2Crosswalk.pdf

For specific information regarding the types of items on the assessments, please refer to the Test and Item Specifications at http://www.k12.wa.us/Mathematics/TestItemSpec.aspx.

Testing for Graduation Requirements

All public high school students are required to meet statewide graduation requirements in order to earn a diploma. Click here to learn more about Washington State Graduation Requirements.

Beginning in Spring 2011, students take end-of-course exams in Algebra 1/Integrated Mathematics 1 and Geometry/Integrated Mathematics 2 based on the 2008 Standards. According to House Bill 1412 which was signed into law by Governor Gregoire on April 11, 2011:

- **Students in the classes of 2013 and 2014** have to pass only **one** end-of-course (EOC) math exam instead of two to be eligible for a diploma. For students who took an EOC exam in Spring 2011, their first retake opportunity will be in January/February 2012.
- **Beginning with the class of 2015**, students have to pass **two** end-of-course exams (Algebra 1 and Geometry, or the Integrated Math equivalents) to be eligible for a diploma.
- **Students in the class of 2012** were not affected by this legislation. These students can meet the assessment graduation requirement by passing one state math exam or by earning two credits of math after 10th grade.
- Students in seventh and eighth grade who take an Algebra 1/Integrated Mathematics 1 or Geometry/Integrated Mathematics 2 course are required to take the grade-level state MSP assessment (for NCLB purposes) and the appropriate end-of-course exam.

Further guidance on specific requirements for students in each class can be found in the OSPI EOC Policy Handout is located at http://www.k12.wa.us/assessment/StateTesting/pubdocs/OSPI_EOC_math-sciences_policy.pdf.

2012 End-of-Course (EOC)/EOC Retake Exams Testing Windows

Winter 2012 MATHEMATICS END-OF-COURSE (EOC) and EOC RETAKE EXAMS
Paper/Pencil Schedule (No online testing for EOC)

Grades	Tests Available	2012 Paper/Pencil Testing Window	Schedule
7-12	EOC exams required for students taking Algebra 1/Integrated Math 1 or Geometry/Integrated Math 2 course on a block/trimester schedule (e.g. finishing the course at the end of the semester) EOC Retake 1 and 2 available for students who previously failed to meet standard on an EOC exam	January 2 to February 10 (Must be administered within three weeks before end of course)	Locally Approved

Spring 2012 MATHEMATICS END-OF-COURSE (EOC) and EOC RETAKE EXAMS
Paper/Pencil Schedule (No online testing for EOC)

Grades	Tests Available	2012 Paper/Pencil Testing Window	Schedule
7-12	EOC exams required for students taking Algebra 1/Integrated Math 1 or Geometry/Integrated Math 2 EOC Retake 1 and 2 available for students who previously failed to meet standard on an EOC exam	May 7 to June 15 (Must be administered within three weeks before end of course)	Locally Approved

A complete state testing schedule can be accessed at:
http://www.k12.wa.us/assessment/StateTesting/timelines-calendars.aspx

Further information regarding EOCs and EOC retake exams is located at
http://www.k12.wa.us/GraduationRequirements/MathEnd-of-CourseExams.aspx.

How do the End-of-Course (EOC) Exams and EOC Retake Exams differ?

End-of-course exams assess the full range of math standards identified for each course in the Washington State K-12 Mathematics Learning Standards. Each end-of-course exam consists of the following items:

- Multiple-Choice, Completion, and Short-Answer items assessing performance expectations (PEs) common to Algebra 1/Integrated Mathematics 1 or Geometry/Integrated Mathematics 2. These PEs are highlighted in green in the End-of-Course Crosswalks.
- Multiple-Choice and Completion items assessing PEs that identify course-specific content. These PEs are highlighted in yellow in each End-of-Course Crosswalk.

Performance Expectations	**Number of Items**			
	Multiple Choice (1 point)	Completion (1 point)	Short Answer (2 points)	Total Items
PEs common to Algebra 1/Integrated Math 1 or Geometry/Integrated Math 2	29	5	3	37
PEs aligned to course-specific content	3-6	1-3	0	6
Total Number of Items				**43**
Additional Pilot Items (Spring administration)				6

End-of-course retake exams assess the math standards that "overlap" in the Washington State K-12 Mathematics Learning Standards. EOC Retake Year 1 assesses the PEs that are common to both Algebra 1 and Integrated Mathematics 1; EOC Retake Year 2 assesses the PEs that are common to both Geometry and Integrated Mathematics 2. Each EOC retake exam consists of the following items:

- Multiple-Choice, Completion, and Short-Answer items assessing PEs common to Algebra 1/Integrated Mathematics 1 or Geometry/Integrated Mathematics 2. These PEs are highlighted in green in the End-of-Course Crosswalks.
- EOC retake exams do not contain items that assess course-specific content.

Performance Expectations	**Number of Items**			
	Multiple Choice (1 point)	Completion (1 point)	Short Answer (2 points)	Total Items
PEs common to Algebra 1/Integrated Math 1 or Geometry/Integrated Math 2	29	5	3	37
Total Number of Items				**37**

Please see the End-of-Course Crosswalks at http://www.k12.wa.us/Mathematics/Crosswalks.aspx for more information.

Guidance for Teachers Preparing Students for EOC Retake Exams

Teachers can take the following steps to help prepare their students for an EOC Retake Exam:

- Become familiar with the Mathematics Standards assessed on each EOC Retake exams by reading the End-of-Course Crosswalks and Test and Item Specifications.
- Collaborate with Algebra 1/Integrated Mathematics 1 and Geometry/Integrated Mathematics 2 teachers and obtain copies of classroom unit and benchmark exams if possible.
- Use sample EOC exam items. These are available from a variety of sources:
    - Sample EOC exams items in this document that assess mathematics standards common to Algebra 1/Integrated Mathematics 1 or Geometry/Integrated Mathematics 2. These are labeled in green.
    - Items that assess mathematics standards common to Algebra 1/Integrated Mathematics 1 or Geometry/Integrated Mathematics 2 from Other Sources of Sample EOC Items listed on page 46 of this document.
    - Sample EOC exams items in *Updates for 2011* that assess mathematics standards common to Algebra 1/Integrated Mathematics 1 or Geometry/Integrated Mathematics 2. These are labeled in green.
    - Previously released items that align with the new mathematics standards are located in Quick Guide Year 1 and Quick Guide Year 2. Items that align with current PEs that are assessed on the EOC Retake exams are labeled in green.
    - The EOC Sample Item Booklet is a sample of end-of-course items. Some of these items can also be found in this document or in previously released items.
- Embed review and reinforcement of mathematical concepts assessed on the EOC Retake(s) within classroom instruction through a variety of ways:
    - Daily warm-ups
    - Weekly review assignments
    - Review problems on classroom tests/quizzes (these items may be graded or formative)
    - Use problems during classroom instruction that incorporate concepts for review from previous courses within the context of the curriculum of the course.
    - Using Collection of Evidence (COE) tasks aligned to mathematics standards common to Algebra 1/Integrated Mathematics 1 or Geometry/Integrated Mathematics 2. These common standards are labeled in green in the End-of-Course Crosswalks and Test and Item Specifications.

Mathematics Formula Sheets for End-of-Course Exams

Mathematics Formula Sheets for End-of-Course Exams are located in the back of the Test and Item Specifications for each course, which are located at http://www.k12.wa.us/Mathematics/TestItemSpec.aspx.

The Mathematics Formula Sheets for End-of-Course Exams are printed directly into all EOC test booklets and will be available to students during testing. The same Mathematics Formula Sheet is used for all EOC exams and EOC Retake Exams. This is to eliminate the need for students to become familiar with more than one formula sheet.

The Mathematics Formula Sheets are not secure and may be copied and distributed for classroom use. Teachers are encouraged to familiarize their students with these formula sheets prior to testing.

Calculator Use and Restrictions Policy

For grades 7-12 on the Measurements of Student Progress (MSP), End-of-Course (EOC) Exams, and EOC Retake Exams

A scientific calculator is sufficient for all items on all end-of-course (EOC) mathematics exams and the Grade 7 and 8 Measurements of Student Progress (MSP). Students need access to the following calculator functions:

- Exponents
- Square root
- Cube root (for all EOC exams)
- Trigonometric functions (for Geometry/Integrated Mathematics 2 and Retake Year 2)

Please see the Calculator Use and Restrictions Policy for students in grades 7-12 taking the MSP, EOC exams, and EOC Retake exams at http://www.k12.wa.us/Mathematics/CalculatorPolicy.aspx.

For more information, see additional calculator resources and a pre-recorded webinar explaining the calculator policy located in section 5 of the EOC Supports Moodle at http://moodle.ospi.k12.wa.us/course/view.php?id=18.

Students in grades 3-6 may not use a calculator on the MSP.

Manipulatives and Tools Allowed

on the Measurements of Student Progress (MSP), End-of-Course (EOC) Exams, and EOC Retake Exams

New content in the K-12 Mathematics Learning Standards has resulted in confusion about which manipulatives are allowed during the state assessments. Use of a variety of manipulatives by teachers during instruction can be beneficial for students to build concrete understanding of mathematical content and procedures. Students are also expected to understand the meaning of symbolic notation, develop fluency, and apply concepts and procedures in problem solving situations. Many performance expectations require students to demonstrate understanding at the symbolic notation, fluency, and application levels. Because of the need to assess these levels of understanding, some manipulatives used in the classroom are not appropriate for use on the state assessments. Of the utmost importance—**manipulatives should not provide answers to items.**

Manipulatives and Tools Allowed	Manipulatives and Tools Not Allowed
Manipulatives that are used during the assessment should not be distributed to the students but should be available in the classroom to students who elect to use them. • Straightedge (all grades) • Ruler with centimeters and inches for grade 3 (required) • Protractor or angle ruler for grade 5 (required) • Compass for Year 2 EOC only • Abacus for visually impaired/blind students using Braille edition • Tiles, algebra tiles, cubes • Base-ten pieces • Pattern blocks, geoboards, Cuisenaire rods • Judy clocks without a digital display • Glossary of Non-Mathematics Terms • Graph paper for grades 3-8 only (must be collected and shredded) *Tools that can remain on teachers' walls:* • Hundreds charts (0-99 or 1-100 only) • Number lines with whole numbers only	Because of the multitude and variety of materials available, the following list of materials that are <u>not</u> allowed is not exhaustive. Consider all manipulatives "Not Allowed" if they are not listed as "Allowed". The following list addresses the most commonly asked questions concerning manipulative use from the field. • Calculators for grades 3-6 • Multiplication or addition matrices • Number lines with integers, fractions, decimals, or markings of multiples, prime, and/or composite numbers • Commercially- or student-made fraction pieces, fraction templates, or fraction materials, whether labeled or unlabeled • Dictionaries or thesauruses • Patty paper or tracing paper • Dry erase boards • Highlighters

If you have further questions regarding manipulatives contact: Assessment@k12.wa.us.

Collection of Evidence and Upcoming Information

The Mathematics COE will return in February 2013 as the class of 2013 prepares to meet the graduation requirement of meeting standard in mathematics. The classes of 2013 and 2014 must pass only one End-of-Course (EOC) exam in order to earn a diploma. Beginning in 2015, students must pass two End-of-Course exams in order to meet the graduation requirements.

The EOCs are in algebra/integrated math 1 and geometry/integrated 2. For simplicity's sake, the algebra/integrated 1 exam is referred to as the Year 1 exam and the geometry/integrated 2 exam is referred to as the Year 2 exam. In order to submit a COE in mathematics, a student must have taken two EOCs and not passed them. They may have taken two Year 1 exams and not met standard on both, two Year 2 exams and not met standard on both, or both a Year 1 and a Year 2 exam and not met standard on either.

A student may submit either a Year 1 or Year 2 COE after receiving their latest EOC results. A student may submit only one collection.

After the February 2013 COE submission window, a new calendar to submit Year 1 and Year 2 COEs will be implemented. The details of that calendar have not yet been determined.

There are support materials to assist teachers and students in preparing Mathematics COEs. The support materials are being developed by OSPI and mathematics experts around the state. Many of the materials are still in development or awaiting approval. There are two documents available for use. These documents are:

1) "COE Eligibility 2013-2014: A Guided Tour." This is a power point presentation prepared by OSPI Mathematics Assessment staff. The presentation helps educators locate eligibility status for students who want to compile COE. It also provides insight on preparing students to produce tasks for their COEs. It is available on the COE webpage: www.coe.k12.wa.us

2) Year 1 and Year 2 draft tasks for use in the February 2013 COE submission. The draft tasks are located in a moodle site. The address is: http://moodle.ospi.k12.wa.us/course/view.php?id=44. Once finalized, the tasks can be used instructionally for preparation for the COE or as the actual tasks to be submitted in the COE. The tasks cannot be used for both purposes.

3) A look-up chart for all of the tasks located on the moodle.

4) A description of the mathematics cognitive complexity descriptions for Year 1 and Year 2 Performance Expectations (PE)

Common Core State Standards Updates

Washington formally adopted the Common Core State Standards (CCSS) July 20, 2011. These standards describe the knowledge and skills in English language arts and mathematics that young people will need upon graduation from high school, whatever their choice of college or career. More than 40 states have now adopted these standards.

OSPI and its partners will oversee a four-phase implementation strategy that begins in 2011-12 with developing awareness of what the standards are and how they differ from existing standards, and will conclude in 2014-15 with implementation of a new assessment system to measure student achievement of the standards. The goal for September 2014 is 100% of English language arts and mathematics teachers are prepared to teach Washington's new Common Core standards.

For more information regarding implementation of Common Core State Standards in Washington State, please see http://www.k12.wa.us/corestandards/ or http://www.k12.wa.us/Communications/PressReleases2011/CommomCore.aspx.

Resources

2011 Lessons Learned from Scoring Student Work

Each year, the Mathematics Assessment Team shares observations about student responses for the Measurements of Student Progress and the End-of-Course Exams and publishes these observations in *Lessons Learned from Scoring Student Work*. The purpose of this document is to provide teachers with insight into common misconceptions and errors that may keep students from earning full credit on state assessment items.

2011 Lessons Learned from Scoring Student Work will be available in November 2011 at http://www.k12.wa.us/Mathematics/LessonsLearned.aspx.

Online Supports

The Mathematics Team has created support Moodle sites to provide a forum for teachers to collaborate and share with other teachers across the state. These Moodle sites contain links to OSPI resources, a database of teacher-created resources, discussion forums, and sample COE tasks.

End-of-Course Supports Moodle: http://moodle.ospi.k12.wa.us/course/view.php?id=18

Mathematics Collection of Evidence Moodle: http://moodle.ospi.k12.wa.us/course/view.php?id=44

Teacher Tool

The Teacher Tool gives diagnostic information about items on the EOC Exams. A brief description of each item on the EOC Exams and EOC Retake Exams is provided as well as state-level performance data.

The Teacher Tool will be available in late October 2011 at http://www.k12.wa.us/TeacherResourceTool2010-11/default.aspx.

2012 Sample Items for Classroom Use

The need to build a robust item bank with items that assess the new mathematics standards prevents the release of actual test items that have been used operationally for the current mathematics standards. In this document you will find new sample items available for classroom use as well as information and links to sample items released in other documents. Items on the EOC exams and on the EOC retake exams will consist of multiple-choice, completion, and short-answer items.

Item Types on End-of-Course and EOC Retake Exams

	Multiple-Choice	Completion	Short-Answer
Point Value	**1**	**1**	**2**
Distinguishing Feature(s)	• Each Multiple-Choice item has four answer choices, the correct answer and three distractors.	• Each Completion item requires the student to enter a numerical answer, an expression with variables, or an equation with variables.	• Each Short-Answer item requires a constructed response. • A Short-Answer item may ask the student to write a sentence or equation; complete a table, graph, or chart; draw a picture; construct a diagram; or perform a calculation. • An Enhanced Multiple-Choice item will ask the student to select from a list of four answer choices and then show work to either explain the reason(s) for choosing that answer or to solve a problem.

New Samples for 2012

These items are samples that are aligned with the K-12 Mathematics Learning Standards. They have not gone through the comprehensive review process that test items must pass before placement on an actual state test. Teachers may still use these items as classroom exercises, or informal checks for understanding, as teachers have the ability and choice to clarify any questions about these items as students are working on them.

Algebra 1/Integrated Mathematics 1

Note: Items that assess A1.8/M1.8 will include content from mathematics standards common to Algebra/Integrated Math 1.

Multiple-Choice Items

Sample item for Performance Expectation A1.2.A/M1.6.A

Which numbers are both less than $-\frac{5}{6}$?

O **A.** -2.1 and $-\frac{6}{5}$

O **B.** $-\frac{2}{3}$ and $-\frac{3}{4}$

O **C.** -0.65 and -1.2

O **D.** $-\frac{2}{3}$ and -0.8

Answer: A

Sample item for Performance Expectation A1.3.A/M1.2.A

The equation of a function is shown.

$$f(x) = |x+1|$$

What is the domain of *f(x)*?

O **A.** All real numbers

O **B.** All real numbers except -1

O **C.** All real numbers greater than -1

O **D.** All real numbers between -1 and 1

Answer: A

Sample item for Performance Expectation A1.4.B/M1.3.D

Which equation represents the line that passes through the points (2, 2) and (4, 1)?

O **A.** $y = -2x + 6$

O **B.** $y = -\frac{1}{2}x + 3$

O **C.** $y = \frac{1}{2}x + 1$

O **D.** $y = 2x - 2$

Answer: B

Sample item for Performance Expectation A1.4.C/M1.3.C

Mary is going to deposit an equal amount of money into a checking account each month until she has saved $500. The amount of money, y, in the account after x months can be modeled by the equation $y = 25x + 100$.

What does the slope of the graph of the equation represent?

O **A.** The amount of money deposited monthly

O **B.** The amount of money originally in the account

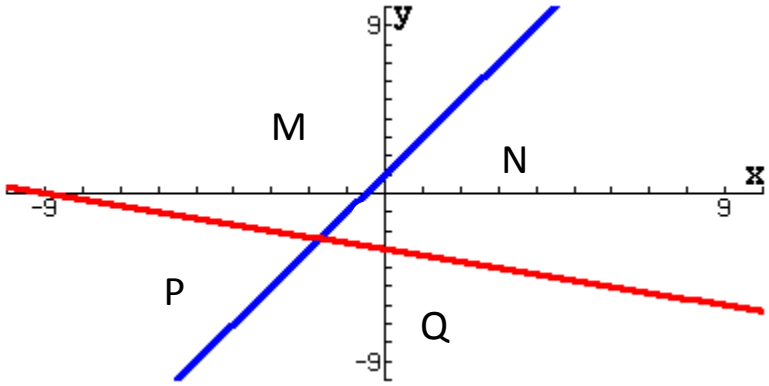
O **C.** The number of months it would take to earn $100

O **D.** The number of months it would take to reach $500

Answer: A

Sample item for Performance Expectation A1.4.D/M1.3.E

Two lines divide the coordinate plane into the four lettered regions shown.



One region represents the solution set to the system of inequalities given.

$$\begin{cases} y \geq 2x + 1 \\ y \leq -\frac{1}{3}x - 3 \end{cases}$$

Which region represents the solution set for the system of inequalities given?

O **A.** Region M

O **B.** Region N

O **C.** Region P

O **D.** Region Q

Answer: C

Sample item for Performance Expectation A1.4.E/M1.3.B

Which statement best describes the transformation of the graph of $y = |x|$ to the graph of $y = |x + 2|$?

O **A.** The graph shifts up 2 units.

O **B.** The graph shifts down 2 units.

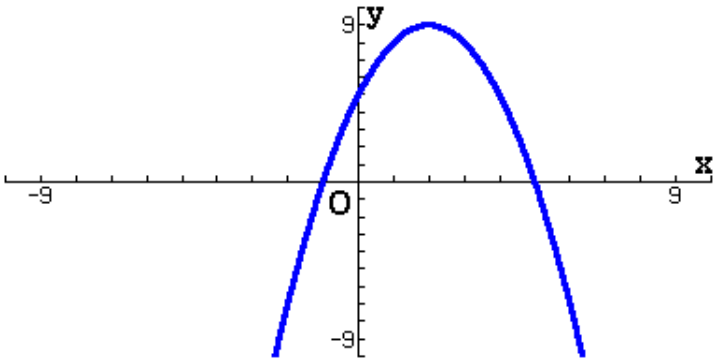
O **C.** The graph shifts left 2 units.

O **D.** The graph shifts right 2 units.

Answer: C

Sample item for Performance Expectation A1.5.B/M2.2.B

A quadratic function is represented by the given graph.



Which values represent the zeros of the function?

O **A.** $x = -5$ or $x = 1$

O **B.** $x = -1$ or $x = 5$

O **C.** $x = 0$ or $x = 5$

O **D.** $x = 2$ or $x = 9$

Answer: B

Sample item for Performance Expectation A1.5.C/M2.2.D

What are the solutions to the equation $x^2 - 4x - 12 = 0$?

O **A.** $x = -6$ or $x = 2$

O **B.** $x = -4$ or $x = 3$

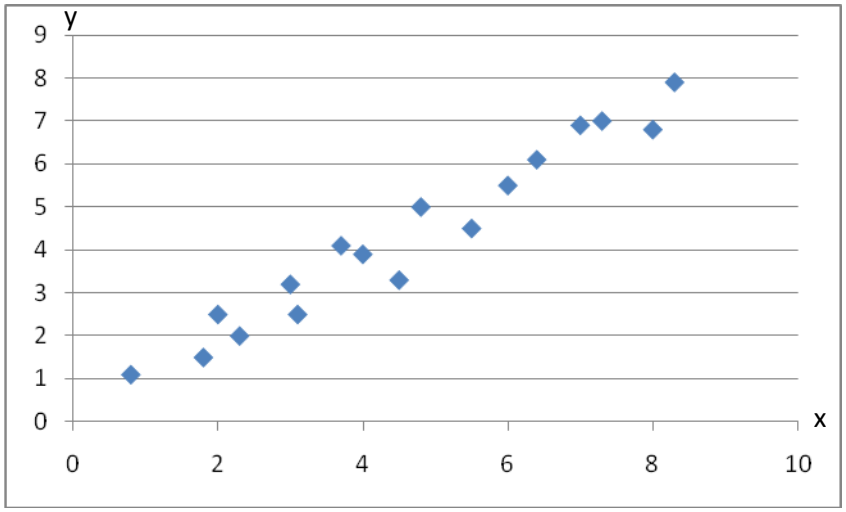
O **C.** $x = -3$ or $x = 4$

O **D.** $x = -2$ or $x = 6$

Answer: D

Sample item for Performance Expectation A1.6.E/M1.3.G

A scatterplot is shown.



Which statement describes the correlation of the data graphed in the scatterplot?

O **A.** Strong negative

O **B.** Strong positive

O **C.** Weak negative

O **D.** Weak positive

Answer: B

Sample item for Performance Expectation A1.7.B/M1.7.B

When $2^x = 16^5$, what is the value of x ?

O **A.** 4

O **B.** 9

O **C.** 20

O **D.** 32

Answer: C

Sample item for Performance Expectation A1.7.C/M1.7.D

What is the fifth term in the geometric sequence with a first term of 3 and a second term of 6?

O **A.** 15

O **B.** 18

O **C.** 32

O **D.** 48

Answer: D

Completion Items

Completion items may ask students to give a numeric answer, an ordered pair, or to write an equation or expression using variables.

Sample item for Performance Expectation A1.1.E/M1.1.D

The population of a town in 2003 was estimated to be 35,000 people with an annual rate of increase of about 2.4%. The equation shown represents the growth of the population, where y is the number of people living in the town in t years after 2003.

$$y = 35000(1.024)^t$$

Determine the approximate population in 2007.

Write your answer on the line.

What is the approximate population in 2007? _____

Answer: 38,483

Sample item for Performance Expectation A1.2.B/M1.6.C

Determine the value of the expression when x = 2, y = 5 and z = -3.

$$4y - 3|x - z^2|$$

Write your answer on the line.

What is the value of the expression? _____

Answer: -1

Sample item for Performance Expectation A1.4.D/M1.3.E

A system of linear equations is given.

$$\begin{cases} 3x - 2y = 6 \\ x - y = 1 \end{cases}$$

Determine the solution to the system of equations.

Write your answer on the line.

What is the solution to the system of equations? (_____, _____)

Answer: (4, 3)

Sample item for Performance Expectation A1.5.C/M2.2.D

A quadratic equation is given.

$$x^2 + 10x - 24 = 0$$

Determine the roots of the quadratic equation.

Write your answer on the line.

What are the roots of the quadratic equation?

_____

Answer: -12 and 2

Sample item for Performance Expectation A1.5.D/M2.2.F

A quadratic equation is given.

$$x^2 - 4x - 8 = 0$$

Use the quadratic formula to determine the roots of the quadratic equation.

Write your answer on the line.

What are the roots of the quadratic equation?

_____

Answer: $2 \pm 2\sqrt{3}$ or equivalent; 5.46 and -1.46

Sample item for Performance Expectation A1.7.C/M1.7.D

Let $a_1 = 8$ and $a_{k+1} = a_k + 3$.

Determine a_7.

Write your answer on the line.

What is the value of a_7? _____

Answer: 26

Short-Answer Items

Short-answer items are scored using one of three types of scoring rubrics. Please see the EOC Item Writing materials posted on the End-of-Course Supports Moodle for more information.

Sample item for Performance Expectation A1.1.C/M1.1.C

The admission fee at a small local fair was $1.50 for children and $4.00 for adults. A total of 2,200 people entered the fair and $5,050 was collected.

Let c = the number of children that attended the fair.
Let a = the number of adults that attended the fair.

- Write two equations that can be used to determine the number of children and adults that entered the fair.
- Solve the system of equations to determine the number of adults that entered the fair.

Show the steps you use to solve the system of equations.

Equation 1: _____ **Equation 2:** _____
How many adults entered the fair? _____

2-point response: The student shows understanding of solving problems that can be represented by a system of two linear equations by doing the following:

Understanding:

- uses 1.50, 4, 2200 and 5050

Procedure:

- shows a procedure involving a system of linear equations to determine the number of adults that enter the fair

Answers:

- writes a system of equations to determine the number of adults that enter the fair
- writes 700.

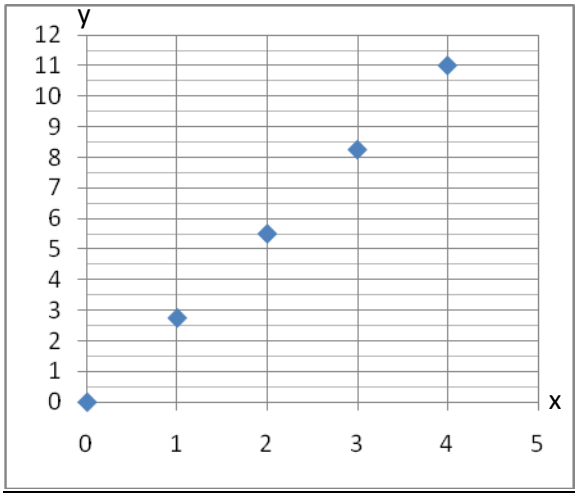
Students can earn 1 point by doing one of the following:

- uses 1.50, 4, 2200 and 5050 and shows a procedure involving a system of linear equations that could lead to determining the number of adults that enter the fair
- writes a system of equations that could be used to determine the number of adults that enter the fair
- writes 700.

Sample item for Performance Expectation A1.8.E(A1.3.B)/M1.8.E(M1.2.B)

Ms. Smith is purchasing a fruit platter. She has received pricing information from three restaurants. Each restaurant uses a different linear function to determine the price of a fruit platter where x is the pounds of fruit purchased.

Restaurant #1



Restaurant #2

$p(x) = 2 + 2.6x$

Restaurant #3

pounds of fruit	price
4	$17.25
6	$20.75
8	$24.25

- Determine which restaurant Ms. Smith should choose to receive the best deal when she purchases a 10-pound fruit platter.
- Based on your choice, determine the price Ms. Smith will pay for a 10-pound fruit platter.

Show the steps you used to solve the problem.

Which restaurant should Ms. Smith choose to receive the best deal?

_____

How much money will Ms. Smith pay for a 10-pound fruit platter?

_____

2-point response: The student shows understanding of reading and interpreting diagrams, graphs, and text containing the symbols, language, and conventions of mathematics by doing the following:

- Writes Restaurant 1 and writes $27.50, or equivalent.
- Shows work to support answer.

Students can earn 1 point by doing one of the following:

- Writes Restaurant 1 and writes $27.50, or equivalent.
- Shows work that could lead to the correct answer.

Sample item for Performance Expectation A1.8.G(A1.6.A)/M1.8.G(M1.5.A)

There are 17 employees at a company. The employees earn these hourly wages.

- 8 employees earn $9 per hour.
- 7 employees earn $12 per hour.
- 2 employees earns $33 per hour.

Determine and explain mathematically which measure of center best represents the hourly wages of employees at the company.

Show the steps you used to solve the problem.

Which measure of center best represents the hourly wage of employees at the company? _____

2-point response: The student shows understanding of synthesizing information to draw conclusions by doing the following:

- Determines that the median best represents the hourly wage of employees in the company
- Explains why the median best represents the hourly wage of employees OR why the mode and mean do not best represent the hourly wage.

Students can earn 1 point by doing one of the following:

- Determines that the median best represents the hourly wage of employees in the company
- Determines a measure of center other than the median best represents the hourly wages of employees and gives a reasonable explanation.
- Explains that the outlier skews the mean or that the mode is the minimum.

Geometry/Integrated Mathematics 2

Note: Items that assess G.7/M2.6 will include content from mathematics standards common to Geometry/Integrated Math 2.

Multiple-Choice Items

Sample item for Performance Expectation G.1.A/ M1.4.A

Which statement illustrated inductive reasoning?

O **A.** John read "$2x + 5 = 8$" and then concluded that $x = \frac{3}{2}$.

O **B.** John read "$5x > 100$" and then concluded that $5x > 50$.

O **C.** John read the sequence "2, 5, 8, 11…" and concluded that the next term in the sequence must be 14.

O **D.** John knew that any number greater than -4 would make the inequality $1 - 3x < 13$ a true statement and concluded that $x = -3$ would make the inequality $1 - 3x < 13$ a true statement.

Answer: C

Sample item for Performance Expectation G.1.D/M2.3.C

Determine the contrapositive of the given statement.

If two angles are right angles, then they are congruent.

Which is the contrapositive of this statement?

O **A.** If two angles are congruent, then they are right angles.

O **B.** If two angles are not congruent, then they are not right angles.

O **C.** If two angles are not right angles, then they are not congruent.

O **D.** If two angles are not right angles, then they could be congruent.

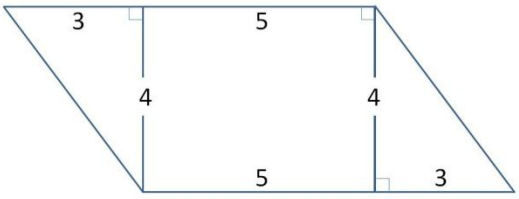
Answer: B

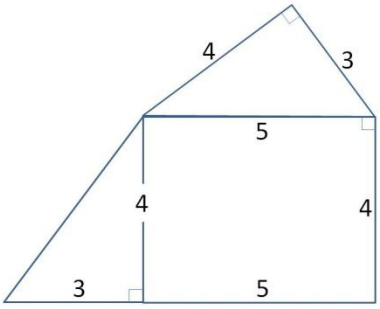
Sample item for Performance Expectation G.1.E/ M2.3.B

Christine knows that if two polygons are congruent, then they must have the same perimeter and area. She concludes that it is also true that if two polygons have the same perimeter and area, then they are congruent.

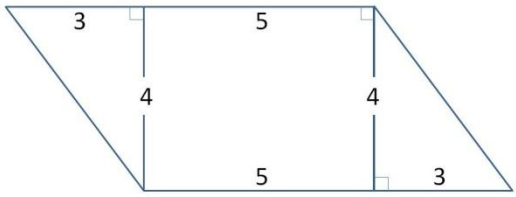
Which pair of polygons can be used as a counterexample to Christine's conclusion?

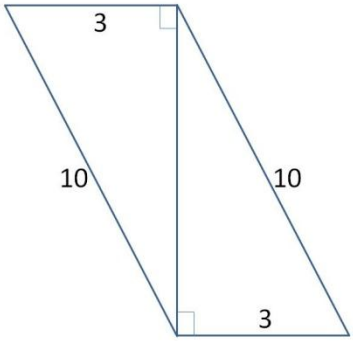
O **A.**



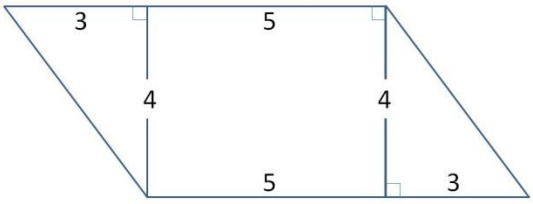


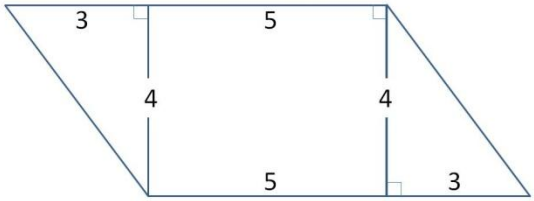
O **B.**



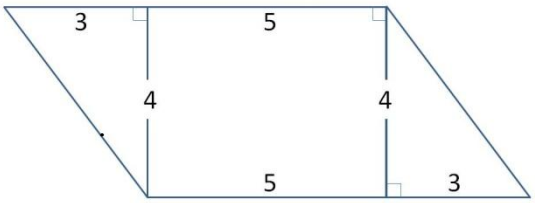


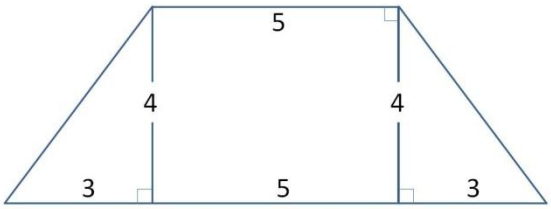
O **C.**





O **D.**





Answer: D

Sample item for Performance Expectation G.2.A/ M1.4.E

Line MN is the perpendicular bisector of line segment PQ at point R.

Which statement must be true?

O **A.** $\overline{MN} \cong \overline{PQ}$

O **B.** $\overline{MR} \cong \overline{NR}$

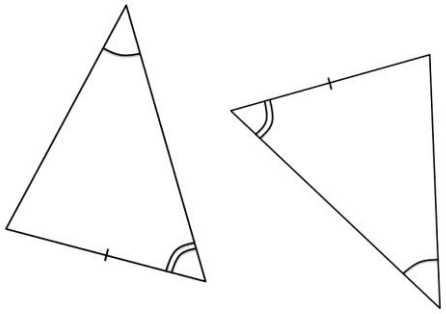
O **C.** $\overline{MR} \cong \overline{PR}$

O **D.** $\overline{PR} \cong \overline{QR}$

Answer: D

Sample item for Performance Expectation G.3.B/M2.3.F

The triangles shown are congruent.



Which postulate or theorem could be used to conclude that the triangles are congruent?

O **A.** AAS

O **B.** ASA

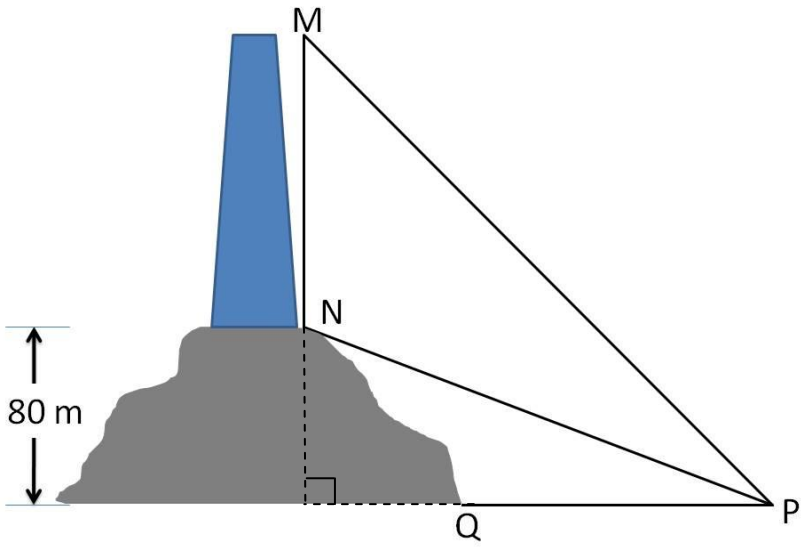
O **C.** SAS

O **D.** SSS

Answer: A

Sample item for Performance Expectation G.7.B (G.3.C,E)/M2.6.B (M2.3.I,H)

A lighthouse stands on a hill 80 meters above sea level. The measure of $\angle MPQ$ is 60 degrees and the measure of $\angle NPQ$ is 30 degrees.



Drawing is not to scale.

What is the height of the lighthouse?

O **A.** 80 meters

O **B.** 120 meters

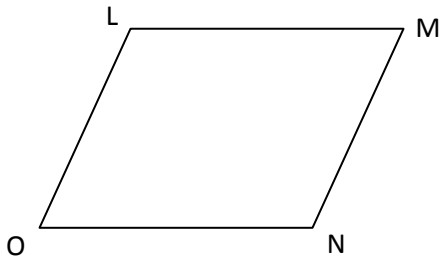
O **C.** 160 meters

O **D.** 240 meters

Answer: C

Sample item for Performance Expectation G.3.G/ M2.3.K

Quadrilateral LMNO is a parallelogram.



Which statement about the parallelogram must be true?

O **A.** $\overline{LN} \cong \overline{OM}$

O **B.** $\Delta LON \cong \Delta NML$

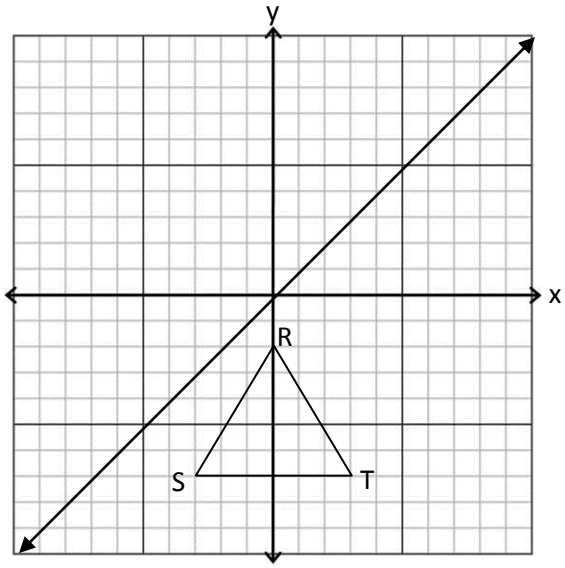
O **C.** $\overline{OM}$ is the bisector of $\angle LON$

O **D.** Diagonals $\overline{LN}$ and $\overline{OM}$ are perpendicular.

Answer: B

Sample item for Performance Expectation G.5.A

Triangle *RST* is shown on the coordinate grid. Point *R* is located at (0, -2).



Triangle *RST* is first reflected across the *x*-axis and then reflected across the line $y = x$ to create triangle *R"S"T"*.

What are the coordinates of the vertex *T"* of triangle *R"S"T"*?

O **A.** (7, 3)

O **B.** (7, -3)

O **C.** (3, 7)

O **D.** (3, -7)

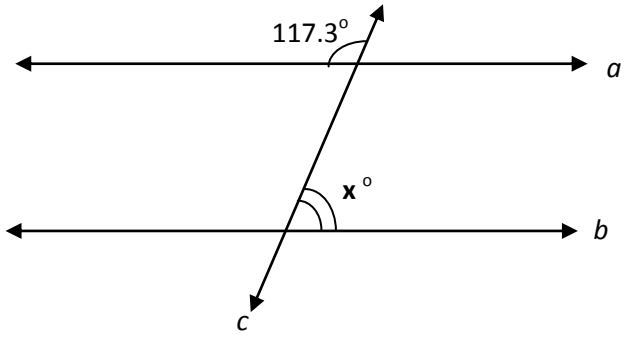
Answer: A

Completion Items

Completion items may ask students to give a numeric answer or to write an equation or expression using variables.

Sample item for Performance Expectation G.2.B/M1.4.F

In the figure shown, lines a and b are parallel and line c is a transversal.



Determine the value of x.

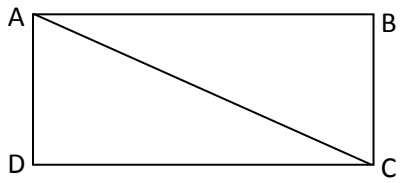
Write your answer on the line.

What is the value of x? _____

Answer: 62.7

Sample item for Performance Expectation G.3.C,D/M2.3.G, I

In rectangle *ABCD*, the length of *AC* is 4 and $m\angle BAC = 30°$.



Determine the exact length of side *CD*.

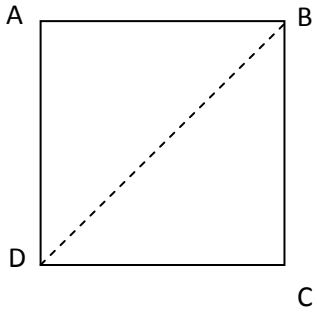
Write your answer on the line.

What is the exact length of side *CD*? _____

Answer: $2\sqrt{3}$

Sample item for Performance Expectation G.3.C,D/M2.3.G, I

Square *ABCD* is shown. Diagonal *BD* has a length of 10 inches.



Determine the exact length of a side of the square.

Write your answer on the line.

What is the exact length of a side of the square? _____ inches

Answer: $\sqrt{50}$ or $5\sqrt{2}$

Sample item for Performance Expectation G.3.G/M2.3.K

The measure of an exterior angle of a regular polygon is 40 degrees.

Determine the number of sides the regular polygon has.

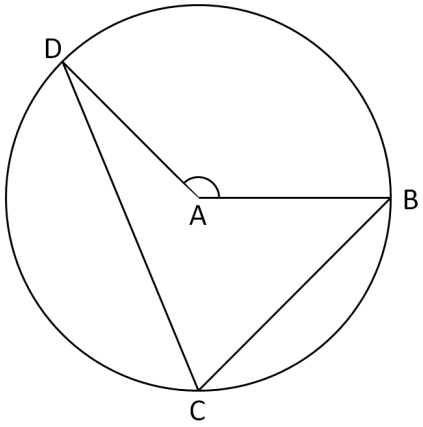
Write your answer on the line.

How many sides does the regular polygon have? _____

Answer: 9

Sample item for Performance Expectation G.3.H

In circle A, $m\angle DAB = 135°$.



Determine the measure of $\angle DCB$.

Write your answer on the line.

What is the measure of $\angle DCB$? _____ ° (degrees)

Answer: 67.5

Sample item for Performance Expectation G.4.A/M1.3.H

Line w passes through the point (5, 9) and is parallel to the line $y = 3$.

Determine an equation that represents line w.

Write your answer on the line.

What is an equation that represents line w ? _____

Answer: $y = 9$

Sample item for Performance Expectation G.4.B/M2.3.L

Points R, S and T are collinear. S is the midpoint of $\overline{RT}$.

The coordinates of point R are (-4, 5). The coordinates of point S are (-1, 3).

Determine the coordinates of point T.

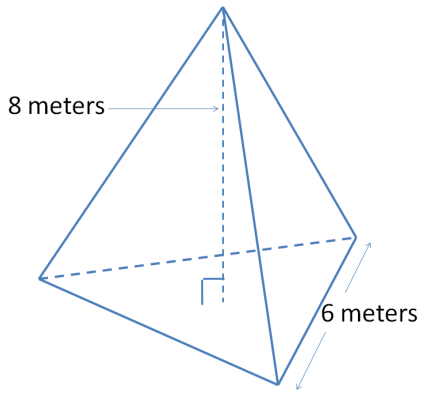
Write your answer on the line.

What are the coordinates of point T ? (_____, _____)

Answer: (2, 1)

Sample item for Performance Expectation G.6.C

The figure shown is a triangular pyramid. The height of the pyramid is 8 meters and the base is an equilateral triangle with a base edge length of 6 meters.



Determine the volume of the triangular pyramid.

Write your answer on the line.

What is the volume of the triangular pyramid? _____ cubic meters

Answer: $24\sqrt{3}$ or approximately 41.57

Short-Answer Items

Short-answer items are scored using one of three types of scoring rubrics. Please see the EOC Item Writing materials posted on the End-of-Course Supports Moodle for more information.

Sample item for Performance Expectation G.1.D/M2.3.C

The given statement is a valid geometric proposition.

If two angles are right angles, then they are congruent.

Write the converse of the given statement.

Determine whether the converse is valid or invalid and provide evidence (example or counterexample) for your answer.

Is the converse of the statement valid or invalid? _____

2-point response: The student shows understanding of writing the converse of a valid proposition and determining its validity by doing the following:

- Writes If two angles are congruent, then they are right angles, or equivalent, for the converse.
- Writes invalid with a counterexample.

1-point response: The student does one of the following:

- Writes If two angles are congruent, then they are right angles, or equivalent, for the converse.
- Writes If two angles are not right angles, then they are not congruent (the inverse) AND writes invalid with counterexample.
- Writes If two angles are not congruent, then they are not right angles (the contrapositive) AND writes valid with explanation.

Sample item for Performance Expectation G.7.B (G.3.A)/M2.6.B (M2.3.E)

The smallest angle of a triangle is three-fourths the measure of the middle angle, and the middle angle is four-fifths the measure of the largest angle.

Determine the measure of the largest angle of the triangle.

Show your work using words and/or numbers.

What is the measure of the largest angle of the triangle? _____ degrees

2-point response: The student shows understanding of solving a problem by doing the following:
Understanding:

- Uses $\frac{3}{4}$ and $\frac{4}{5}$

Strategy:

- Shows a strategy to determine the measure of the largest angle

Answer:

- Writes 75.

1-point response: The student does one of the following:

- Uses $\frac{3}{4}$ and $\frac{4}{5}$ and shows a strategy that could lead to the measure of the largest angle.
- Writes 75.

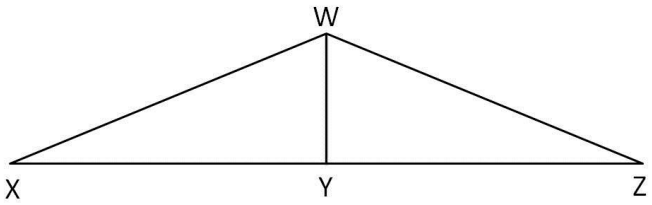
Sample item for Performance Expectation G.3.B/M2.3.F

A proof is shown.

Fill in the blanks for steps 4 and 5 to complete the proof.

Given: $\overline{WY}$ is the perpendicular bisector of $\overline{XZ}$

Prove: $\Delta WXY \cong \Delta WZY$



Statements	Reasons
1. $\overline{WY}$ is the perpendicular bisector of $\overline{XZ}$.	1. Given
2. $\angle WYX \cong \angle WYZ$	2. Perpendicular lines form 90 degree angles
3. $\overline{WY} \cong \overline{WY}$	3. Reflexive property of congruence
4.	4. A bisector divides a segment into two equal halves
5. $\Delta WXY \cong \Delta WZY$	5.

2-point response: The student shows understanding of proving triangle congruence by doing the following:

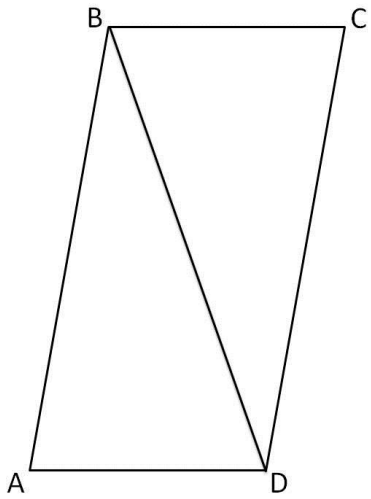
- Writes $\overline{XY} \cong \overline{YZ}$, or equivalent, for statement 4
- Writes Side-Angle-Side, or equivalent, for reason 5

Students can earn 1 point by doing one of the above.

Sample item for performance expectation G.3.B/M2.3.F

In the diagram:

- Quadrilateral ABCD with $\overline{AB} \cong \overline{DC}$
- $\angle ABD \cong \angle CDB$



Prove $\Delta ABD \cong \Delta CDB$ using mathematical language and concepts.

Proof:

2-point response: The student shows understanding of proving triangle congruence by doing the following:

- Writes $\overline{AB} \cong \overline{DC}$ and $\angle ABD \cong \angle CDB$ (given)
- Writes $\overline{BD} \cong \overline{BD}$ by reflexive property, or equivalent
- Writes $\Delta ABD \cong \Delta CDB$ by Side-Angle-Side, or equivalent

1-point response: The student does one of the following:

- Writes $\overline{BD} \cong \overline{BD}$ by reflexive property, or equivalent
- Writes $\overline{BD} \cong \overline{BD}$ and writes $\Delta ABD \cong \Delta CDB$ by Side-Angle-Side, or equivalent

Note: Student responses may be in the form of a flow chart proof, two-column proof, or paragraph proof. Student responses should refer to the given information within the proof.

Sample item for Performance Expectation G.7.B (G.3.D)/M2.6.B (M2.3.G)

The length of one diagonal of a rectangle is 17 feet. The length of the rectangle is 7 feet greater than its width.

Determine the perimeter of the rectangle.

Show your work using words and/or numbers.

What is the perimeter of the rectangle? _____ feet

2-point response: The student shows understanding of solving a problem by doing the following:
Understanding:

- Uses 17 and 7

Strategy:

- Shows a strategy to determine the perimeter of the rectangle

Answer:

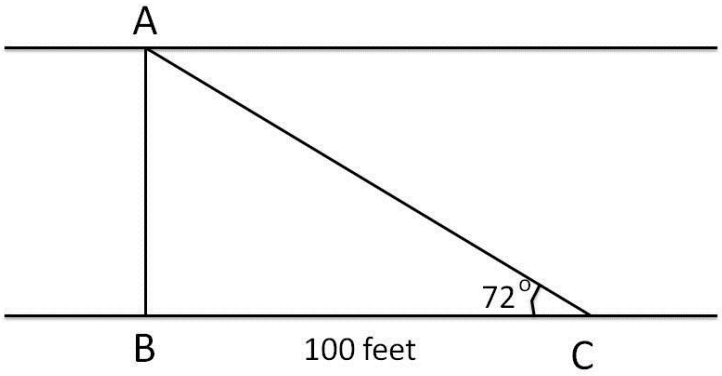
- Writes 46.

1-point response: The student does one of the following:

- Uses 17 and 7 and shows a strategy that could lead to the perimeter of the rectangle
- Writes 46.

Sample item for Performance Expectation G.3.E/M2.3.H

Two trees stand on opposite banks of the river, located at points *A* and *B*. A surveyor is standing at point *C* which is 100 feet from point *B*. He measures angle *ACB* to be 72 degrees.



Determine the length of *AB*, the width of the river to the nearest hundredth.

Show your work using words and/or numbers.

What is the length of AB to the nearest hundredth? _____ feet

2-point response: The student shows understanding of solving problems involving basic trigonometric ratios by doing the following:

- Shows use of tangent such as $\tan(72°) = \frac{AB}{100}$, or equivalent.
- Writes 307.77 feet.

1-point response: The student does one of the following:

- Shows use of tangent such as $\tan(72°) = \frac{AB}{100}$, or equivalent.
- Writes 307.77 feet.

Other Sources of Sample EOC Items

Aside from the sample items contained in this document, more sample items can also be found in the following resources:

- Updates for 2011: http://www.k12.wa.us/Mathematics/pubdocs/Updatesfor2011_EOC.pdf

  This document contains sample EOC items in multiple choice, completion, and short answer formats, with solutions. Sample items for Year 1 begin on page 13; sample items for Year 2 begin on page 18.

- EOC Sample Item Booklet: http://www.k12.wa.us/Mathematics/pubdocs/EOCSampleBookletAnswerKey.pdf

  The Sample Item Booklet contains 20 sample items in multiple choice, completion, and short answer formats, and an answer key.

- Quick Guides of previously released WASL items aligned to the new math standards:
  - Year 1: http://www.k12.wa.us/Mathematics/pubdocs/QuickGuide_YR1.pdf
  - Year 2: http://www.k12.wa.us/Mathematics/pubdocs/QuickGuide_YR2.pdf

  These documents contain previously-released WASL items that align to the Mathematics Standards for EOC.

- End-of-Course Supports Moodle: http://moodle.ospi.k12.wa.us/course/view.php?id=18

  This site contains a database of teacher-created resources where educators can share sample items and assessments.

- Mathematics Collection of Evidence Moodle: http://moodle.ospi.k12.wa.us/course/view.php?id=44

  This site contains sample tasks for the Mathematics Collection of Evidence.

Contact Information

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