



Computing Technology for Math Excellence

## Preparing for the Ohio Graduation Test in Mathematics

### Strand Resources: Geometry and Spatial Sense

The following pages are for students. Use them to help you monitor your own test preparation. You can print the entire booklet, or just those pages for benchmarks you want to work on. The resources provided are at CT4ME: [http://www.ct4me.net/Ohio\\_Graduation\\_Math\\_Test\\_Prep\\_GeometryStrand.htm](http://www.ct4me.net/Ohio_Graduation_Math_Test_Prep_GeometryStrand.htm)

#### Directions:

1. Identify the benchmark (A-I) below for review in Geometry and Spatial Sense. Below the benchmark, you will find Web resources for reviewing the concept and practice problems.
2. *Before beginning the Web exercises* for the benchmark you chose, fill in the “K” column: What do you already know about that benchmark? Then in the “W” column: Write what you still want to know.
3. When you have completed using a resource provided, place a check in the box in the first column. This will help you keep track of resources used. Decide if the resource was helpful. Write “yes” or “no” in the last column. Add your comments, if any, about the resource.
4. *After using all the resources* for each benchmark, go to the “L” column and write what you learned. Read your “K” column entries again to see if any of your prior knowledge was inaccurate, and rewrite those statements so that they are correct.
5. Look at the “W” column again, and place a check next to any of your questions that were not answered by using the resources. Be sure to mention those questions in class. Decide how you will find answers to those remaining questions.
6. *When you have completed all of the exercises provided with each benchmark and your K-W-L chart is complete*, reflect on your overall understanding of the benchmark. Be honest with yourself. In the last column circle your belief about your level of mastery: still no or very little understanding (N), some to a great deal of progress (P), I’ve got it!--mastery (M).

Name \_\_\_\_\_

NOTE: As general resources for all Geometry and Spatial Sense benchmarks, students might consult the following:

- [Math Open Reference](#) is a free geometry textbook for high school learners. There are topics in plane geometry, coordinate geometry, and solid geometry (e.g., cylinders, cubes). Its focus is on using interactive materials and animations to develop concepts. Students can manipulate numerous interactive applets with at least one accompanying nearly every concept that is presented.

A. Formally define geometric figures.		Circle Mastery Level: N            P            M
What I <b>K</b> now	What I <b>W</b> ANT to know	What I <b>L</b> earned
Check when completed	Resources	Was the Web resource helpful? (yes/no) Comment(s)
	Learner.org: <a href="#">Glossary of key geometry terms</a>	

Name \_\_\_\_\_

	Math.com: <a href="#">Geometry</a> basics. Figures are defined with lessons, examples, workout quizzes, and unit quizzes	
	Mathwords.com: <a href="#">interactive math dictionary</a> with words, terms, formulas, pictures, diagrams, tables, and examples	
	Explore Learning Gizmos (Virtual Manipulatives): <a href="#">Quadrilaterals and other Polygons</a> .	
	<a href="#">Geometry 3-D Shapes</a> is one of the <b>Interactives</b> from Annenberg Media's Learner.org. Learn about three-dimensional shapes, calculate surface area and volume, and discover some of the mathematical properties of shapes. Use the tutorials and take the interactive test.	

Name \_\_\_\_\_

B. Describe and apply the properties of similar and congruent figures; and justify conjectures involving similarity and congruence.		Circle Mastery Level: N            P            M
What I <b>K</b> now	What I <b>W</b> ANT to know	What I <b>L</b> earned
Check when completed	Resources	Was the Web resource helpful? (yes/no) Comment(s)
	<p>AlgebraLab.org: Lesson and fill in the blank practice problems, including word problems. Be sure to show the related AlgebraLab documents for additional practice problems on each topic.</p> <ul style="list-style-type: none"> <li>• <a href="#">Congruent Triangles</a></li>   <li>• <a href="#">Similar Triangles</a></li> </ul>	

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	<p>Math.com: <a href="#">Congruent and similar figures</a> including lesson and workout problems</p>	
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	<p><a href="#">NCTM Illuminations: Congruence Theorems Applet</a>. Use this virtual manipulative to investigate congruence by manipulating the sides and angles of a triangle.</p>	
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	<p>Utah State University, National Library of Virtual Manipulatives: investigate methods for determining <a href="#">congruent triangles</a>. Explore SSS, SAS, ASA, SSA. Note SSA does not guarantee congruent triangles.</p>	
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Name \_\_\_\_\_

C. Recognize and apply angle relationships in situations involving intersecting lines, perpendicular lines and parallel lines.		Circle Mastery Level: N            P            M
What I <b>K</b> now	What I <b>W</b> ANT to know	What I <b>L</b> earned
Check when completed	Resources	Was the Web resource helpful? (yes/no) Comment(s)
	<p>AlgebraLab.org: Lesson and fill in the blank practice problems. Be sure to show the related AlgebraLab documents for additional practice problems on each topic.</p> <ul style="list-style-type: none"> <li>• <a href="#">Parallel Lines and Transversals</a></li> </ul>	

Name \_\_\_\_\_


	<ul style="list-style-type: none"><li>• <a href="#">Slope of Parallel and Perpendicular Lines</a></li></ul>	
	Math.com: <a href="#">Angles and Intersecting Lines</a> including lesson and workout problems	
	AmbleWeb, Virtual Manipulative: <a href="#">20 Virtual Protractor Angle Activities</a> -- investigate sum of interior and exterior angles in polygons, supplementary angles, angles created by parallel lines and a transversal, vertical angles, and so on.	

Name \_\_\_\_\_

	<p><a href="#">NCTM Illuminations: Angle Sums Applet.</a> Use this virtual manipulative to examine the angles in a triangle, quadrilateral, pentagon, hexagon, heptagon or octagon. The purpose is to find a relationship between the number of sides and the sum of the interior angles of the polygon.</p>	
	<p>Shodor Interactivate, Virtual Manipulative: <a href="#">Angles</a> formed by parallel lines and one or two transversals</p>	



Name \_\_\_\_\_

	<p><a href="#">Walter Fendt's Sum of Angles in a Triangle</a>, Virtual Manipulative</p>	
	<p> Play the YouTube video from the Ohio Resource Center Tutorials for High School Mathematics: <a href="#">Parallel lines, polygons, and the Pythagorean Theorem</a> for finding values for alternate interior angles, finding values for the exterior angles of regular polygons, and using the Pythagorean theorem.</p>	

Name \_\_\_\_\_

D. Use coordinate geometry to represent and examine the properties of geometric figures.		Circle Mastery Level: N            P            M
What I <b>K</b> now	What I <b>W</b> ANT to know	What I <b>L</b> earned
Check when completed	Resources	Was the Web resource helpful? (yes/no) Comment(s)
	Math Warehouse: <a href="#">Using the coordinate plane in proofs</a> is an interactive demonstrating how to do coordinate proofs. Do the proofs (perpendicular segments, trapezoid is not isosceles, and rectangle) and see the answers.	

Name \_\_\_\_\_

E. Draw and construct representations of two- and three-dimensional geometric objects using a variety of tools, such as straightedge, compass and technology.		Circle Mastery Level: N            P            M
What I <b>K</b> now	What I <b>W</b> ANT to know	What I <b>L</b> earned
Check when completed	Resources	Was the Web resource helpful? (yes/no) Comment(s)
	Mathematics Open Reference: Visual demonstrations of how to do various <a href="#">Euclidean constructions with compass and straightedge</a> .	
	Virtual manipulative: <a href="#">Explore the net for a pyramid</a> with rectangular base. You can modify the length, width, and height in this JAVA applet by Pavel Safronov (MSTE division at University of Illinois-Urbana-Champaign).	

Name \_\_\_\_\_

	<p>Virtual manipulative: <a href="#">Explore building "houses" with cubes</a>, given the top, front, and right side views. This activity builds 3-D spatial abilities. This JAVA applet is from the Freudenthal Institute.</p>	
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<p>F. Represent and model transformations in a coordinate plane and describe the results.</p>		<p>Circle Mastery Level: N          P          M</p>
<p>What I <b>K</b>now</p>	<p>What I <b>W</b>ANT to know</p>	<p>What I <b>L</b>earned</p>
<p>Check when completed</p>	<p>Resources</p>	<p>Was the Web resource helpful? (yes/no) Comment(s)</p>
	<p>Utah State University, National Library of Virtual Manipulatives: show axes, create objects with pattern block pieces, then apply and explore the following:</p> <ul style="list-style-type: none"> <li>• <a href="#">Translations</a></li> </ul>	

Name \_\_\_\_\_

	<ul style="list-style-type: none"><li>• <a href="#">Reflections</a></li> <li>• <a href="#">Rotations</a></li> <li>• <a href="#">Effect of two transformations</a> (Translations, Reflections, or Rotations) in any order.</li></ul>	
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Name \_\_\_\_\_

G. Prove or disprove conjectures and solve problems involving two- and three-dimensional objects represented within a coordinate system.		Circle Mastery Level: N            P            M
What I <b>K</b> now	What I <b>W</b> ANT to know	What I <b>L</b> earned
Check when completed	Resources	Was the Web resource helpful? (yes/no) Comment(s)
	Utah State University, National Library of Virtual Manipulatives: <a href="#">Platonic Solids</a> , <a href="#">Verify Vertices, Faces, Edges of five Solids</a>	

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H. Establish the validity of conjectures about geometric objects, their properties and relationships by counter-example, inductive and deductive reasoning, and critiquing arguments made by others.		Circle Mastery Level: N            P            M
What I <b>K</b> now	What I <b>W</b> ANT to know	What I <b>L</b> earned
Check when completed	Resources	Was the Web resource helpful? (yes/no) Comment(s)
	Utah State University, National Library of Virtual Manipulatives: walk through a <a href="#">visual proof of the Pythagorean theorem.</a>	

Name \_\_\_\_\_


I. Use right triangle trigonometric relationships to determine lengths and angle measures.		Circle Mastery Level: N            P            M
What I <b>K</b> now	What I <b>W</b> ANT to know	What I <b>L</b> earned
Check when completed	Resources	Was the Web resource helpful? (yes/no) Comment(s)
	Why is $a^2 + b^2 = c^2$ in the right triangle? See <a href="#">an easy proof</a> from the MacTutor History of Mathematics archive. Or, explore the <a href="#">virtual manipulative</a> .	
	 Play videos 9-13 on Pythagorean Theorem, sine, cosine, and tangent ratios at GCSE Maths Tutor: <a href="#">Introducing Trigonometry</a> . Videos 11-13 define sin, cos, tan and their limits are explored. The values of common angles 30, 45	



Name \_\_\_\_\_

	<p>and 60 degrees are described. The tutorials include worked examples of three common problem types.</p> <ul style="list-style-type: none"><li>• <a href="#">#9 - Pythagoras'Theorem - Part 1:</a></li> <li>• <a href="#">#10 - Pythagoras'Theorem - Part 2:</a></li> <li>• <a href="#">#11 - The Sine Ratio:</a></li> <li>• <a href="#">#12 - The Cosine Ratio:</a></li></ul>	
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	<ul style="list-style-type: none"><li>• <a href="#">#13 - The Tangent Ratio:</a></li></ul>	
	 Play the YouTube video from the Ohio Resource Center Tutorials for High School Mathematics: <a href="#">Right Triangle Trig</a> for reviewing trig definitions and applying trig in practical problems.	
	AlgebraLab.org: Lesson and fill in the blank practice problems. <ul style="list-style-type: none"><li>• <a href="#">Pythagorean Theorem</a> lesson and exercises</li></ul>	

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	<ul style="list-style-type: none"><li>• <a href="#">Word problems with Pythagorean Theorem</a></li></ul>	
	<p>Mathguide.com: Pythagorean theorem quizmaster. The following are fill in and check answers, which are rounded to the nearest tenth. The formula is presented with the following:</p> <ul style="list-style-type: none"><li>• <a href="#">Find the hypotenuse</a></li> <li>• <a href="#">Find a leg</a> in a right triangle.</li></ul>	
	<p>Math.com: <a href="#">Right Triangle and Pythagorean Theorem</a> including lesson and workout problems</p>	

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**Are you ready for the test?**

1. Don't forget to [review and complete the Six Steps for Success, including the full online practice tests.](#)
2. Complete an [online OGT Practice Test.](#)

How did you do?

Score: \_\_\_\_\_ right out of \_\_\_\_\_ questions.



Look at the "W" column again for the benchmarks you chose to work on. List the questions you checked that you still have. For each of those, decide how you will find the answer.

What I still <b>WANT</b> to know—my unanswered questions	My Plan to Find the Answers

Name \_\_\_\_\_

Use this page for additional resources you use for test preparation. Write the benchmark.

Benchmark:		Circle Mastery Level: N          P          M
What I <b>K</b> now	What I <b>W</b> ANT to know	What I <b>L</b> earned
Check when completed	Resources	Was the resource helpful? (yes/no) Comment(s)