

Quantiles: Coming Soon to a Score Report Near You!

Presented by:

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Introducing the Quantile Framework for Mathematics

- Why Quantiles?
 - More specific information about individual students
 - Assists teachers, parents, even students
 - Linked to curriculum, textbooks, and other resources
- Quantile scores are free to schools
 - State wide contract
 - When are scores available?
 - Now for math EOC math (block)
 - Later this spring for all other EOC and all EOGs



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Agenda

- What is the Quantile Framework?
 - How does it compare to Lexiles?
- How do my students get Quantile measures?
- What does a Quantile measure mean?
 - Uses in the classroom?



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Lexiles and Quantiles... Reading and math...really?!

Are they the same?



It depends...some similarities and some differences.



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Similarities: Lexile and Quantiles

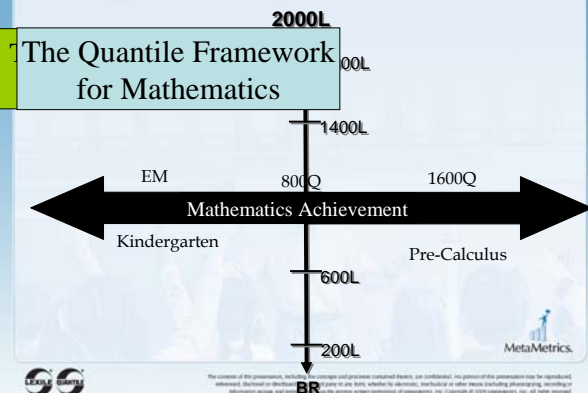
Both are:

- Vertical, developmental scales
 - Useful for developing individual growth trajectories
- Each measures one construct
 - Different constructs
 - Lexile = reading;
 - Quantiles = mathematics
- Based on the Rasch model student measure AND resource measure on same scale
- Instructional implications (e.g. differentiating instruction)
- Free! (measures and website)



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Lexiles and Quantiles: Both are vertical, developmental scales



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Lexiles and Quantiles:
Each measure one construct.

The Lexile scale provides a *single metric* for
rep
**In other words, students will receive
BOTH a Lexile and a Quantile score.**

Example:

Student score report:

Emma Jane

900L 740Q

rations
Functions
ability

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Instructional Implications

Student Quantile
Measure

Resources:

- Math skills/topics targeted to student's math achievement level
- Knowledge clusters
 - Textbooks
 - Websites
 - Games
- Math at Home
- Trade books
- Worksheets

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Both Lexiles and Quantiles websites are free.

www.Lexile.com

www.Quantiles.com

Note the "S" in Quantiles

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Similarities: Lexile and Quantiles, con't

- Scores are obtained in similar ways
 - Linking studies
 - Partner products
 - Resource measurement
- Similar interpretations
 - Grade appropriateness is important
 - High Lexile measure in Grade 3
 - High Quantile measure in Grade 3

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Other FAQ...

- Is there a connection between the Lexile scale and the Quantile scale?
 - No
- Should students have similar Lexile and Quantile measures?
 - No
- Is reading considered when measuring math items?
 - Yes...

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More about the Quantile
Framework for Mathematics

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The Quantile Framework is NOT:

- An indicator of mastery of specific skills.
- A list of mathematical skills.
- A curriculum for mathematics.
- A mathematics program.
- A grade equivalent.
- A measure for a worksheet or test.



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The Quantile Framework

Is like a "gauge" or "yardstick"---it's way to measure the development of:

- Students' mathematical knowledge, and
- Difficulty of math tasks



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Quantile Framework Taxonomy

- There over 450 QTaxons in the taxonomy of the Quantile Framework.
 - QTaxon refers to a specific mathematical skill or concept
 - Range from Kindergarten to Pre-Calculus
- Where does the list of QTaxons come from?
 1. National Council of Teachers of Mathematics (NCTM)
 - Including the five content strands:
 - (1) Numbers and Operations
 - (2) Algebra/Patterns & Functions
 - (3) Probability & Data Analysis
 - (4) Geometry
 - (5) Measurement
 2. TIMSS, NAEP frameworks
 3. State curriculums (including NC)



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Map of the Quantile Framework



This is a snapshot of only 20% of the QTaxons in the Quantile Framework.

How do we get a Quantile measure for a QTaxon?

- Field Study February 2004
 - Tests for Grades 2 through Algebra II
 - Ancillary Materials: rulers, protractors, calculators, and reference sheets
 - Sample: $N = 9,847$ students in 34 schools and 6 states
- And then...
 - Identify items that meet psychometric criteria
 - Identify items that are representative of the QTaxon and match what is typically taught during the first lesson
 - Relationship with prerequisite and impending QTaxons (i.e., the knowledge clusters)



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Characteristics of the Quantile Scale



The Quantile scale is:

1. Developmental and
2. Unidimensional (i.e., one score describes mathematics achievement)



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The Quantile Scale

The Quantile scale is developmental.

250Q Length	400Q Perimeter	840Q Volume of prisms.	930Q Circumference	1040Q Area of triangles, parallelograms, trapezoids.
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The Quantile Scale is a developmental scale. (across the strands)

Numbers & Operations
240Q:
Use Skip counting to model multiplication

Algebra, Patterns & Functions
360Q:
Describe & demonstrate patterns in skip counting

Probability & Statistics
470Q:
Display, read, or interpret data on a line graph

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Interaction of the Content Strands

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The Quantile Framework

Developmental scale that *fills*

Mathematical Skill/Topic/Concept

Quantile Measure (Q)

Characterizes the *problem-*

Student Quantile Measure (Q) *1 measure on the same developmental scale.*

The Quantile measure uses a common metric for *both*

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How do students get Quantile Measures?

For some, it's here now (block EOC)
For the rest, it's right around the corner!

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North Carolina End-of-Grade Test
Regular Test Administration Spring 2009
Individual Student Report
Public Schools of North Carolina

Student Teacher: _____
School Name: _____
System Name: _____
Grade Level: 5

Reading	Scale Score: 351 Percentile Rank (2008): 53 Achievement Level: III Lexile Measure: 990L Met State Gateway: YES	Mathematics	Scale Score: 365 Percentile Rank (2008): 88 Achievement Level: IV Quantile Measure: 1040Q Met State Gateway: YES
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Reading Developmental Scale Score: 320 330 340 350 370
Achievement Levels: I II III IV
Student: III
School: III
System: III
State 2008: III

Mathematics Developmental Scale Score: 330 340 350 360 370 380
Achievement Levels: I II III IV
Student: IV
School: IV
System: IV
State 2008: IV


Students performing at this level consistently demonstrate mastery of grade level subject matter and skills and are well prepared for the next grade level.

Students performing at Level IV commonly show a high level of understanding, compute accurately, and respond consistently with appropriate answers or procedures. They demonstrate flexibility by using a variety of problem-solving strategies.

Students consistently demonstrate number sense for rational numbers (0.001 through 999.999). They consistently demonstrate ability in the addition, subtraction, multiplication, and division of rational numbers.

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What's the relationship between the NC Scale and the Quantile Scale?



NC Scale Score → **Quantile Measure**

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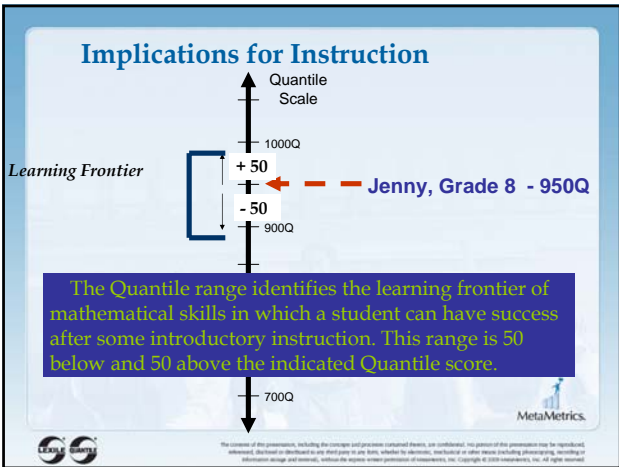
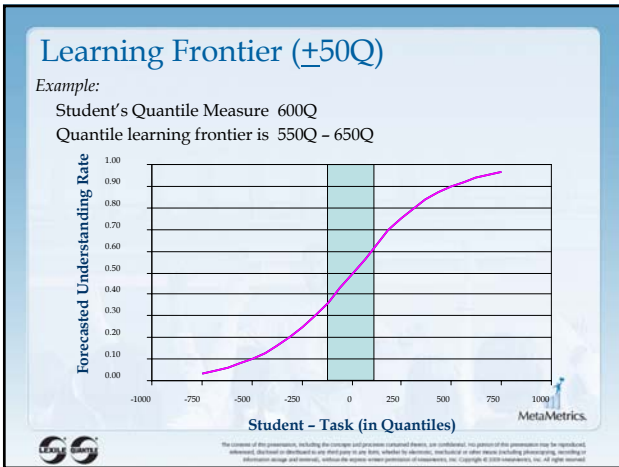
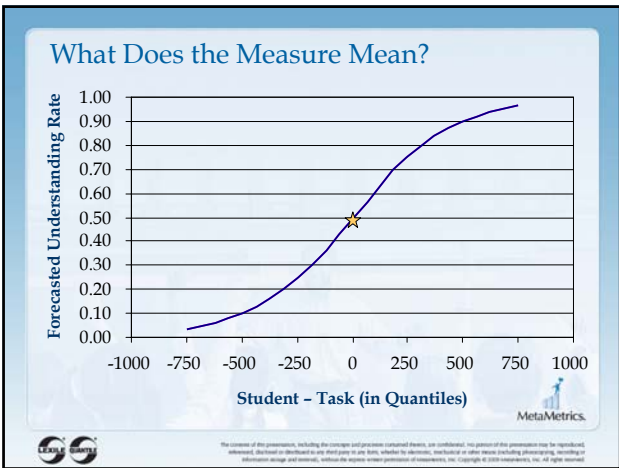
Developing a Link (Relationship) between the Quantile Framework and NC EOGs/EOCs

- Have students take **both** a NC EOG/EOC test *and* a Quantile Linking test
 - Grades 3, 5, 7, Algebra 1, Geometry, Algebra 2
 - Sample included over 1,000 students per grade/course
- Quantile Linking test closely matches the NC EOG/EOC tests
 - Same content
 - Same number of items
 - Same materials (calculator, ruler, protractor, formula sheets)

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What does a QM mean?

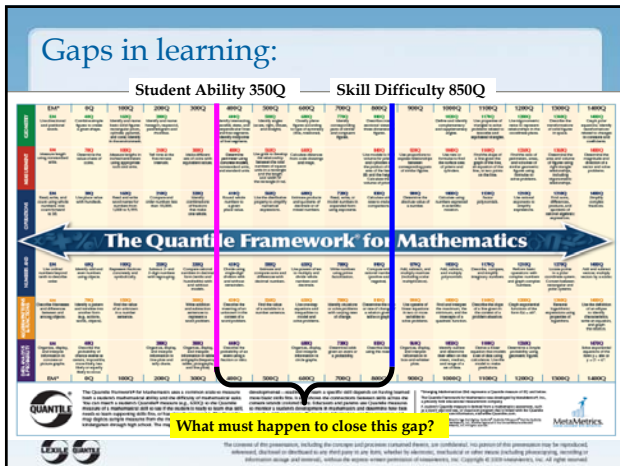
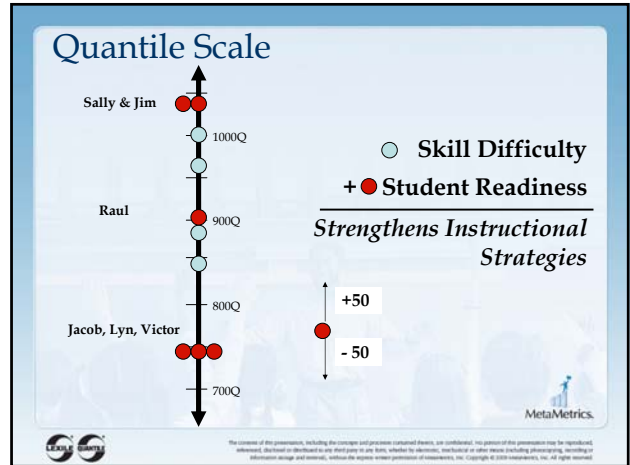
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Typical Grade Ranges

Grade	Student Measures (Interquartile Range, Mid-Year)	QTaxon Measures (Interquartile Range)
K-1	EM to 260Q	EM to 30Q
2	175Q to 405Q	85Q to 250Q
3	375Q to 605Q	250Q to 470Q
4	480Q to 720Q	470Q to 620Q
5	550Q to 815Q	640Q to 840Q
6	645Q to 895Q	720Q to 900Q
7	665Q to 995Q	790Q to 990Q
8	730Q to 1020Q	840Q to 1050Q
9	760Q to 1065Q	990Q to 1140Q
10	810Q to 1115Q	1100Q to 1220Q
11 and 12	890Q to 1240Q	1100Q to 1270Q

Grade 9: Typically Algebra I
Grade 10: Typically Geometry
Grade 11 and 12: Typically Algebra II



A Snapshot of the Quantile Website

- Math Skill Database**
 - QTaxon Search
 - Knowledge Clusters
 - Curriculum Alignment
 - Textbook lesson alignment
 - Instructional Resources
- Math At Home**
- Find your Textbook**
- General Resources**
- Quantile Teaching Assistant**

www.Quantiles.com

THE QUANTILE FRAMEWORK FOR MATHEMATICS
LINKING ASSESSMENT WITH MATHEMATICS INSTRUCTION

INFORMATION FOR:
Departments of Education
Principals & Educators
Families & Students
Assessment & Instruction Companies
Textbook Publishers

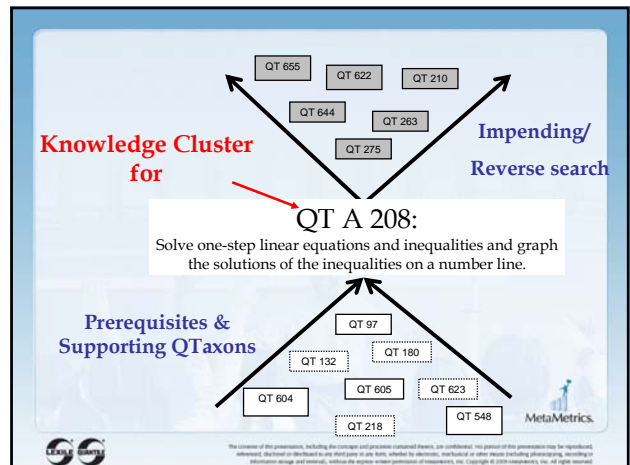
RECENTLY ASKED QUESTIONS:
• How do I get a Quantile measure?
• What does my Quantile measure mean?
• How can I use Quantile measures in the classroom?
• How can I use Quantile measures at home?
• How can I get my product/service in the Quantile Framework?

NEWS & EVENTS:
METAMETRICS SEEKING CONTRACT ITEM WRITERS
Click for more information and to apply.
DOWNLOAD THE PRESENTATIONS NOW!
MetaMetrics' 2008 Louisiana National Conference & Quantile Implementation Series 10-19

REOURCES:
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Math at Home
Find your Math Textbook

Frequently Asked Questions • Tools • Resources • Research • Professional Development • News & Events • Contact Us
About MetaMetrics • The Quantile Framework for Reading • The Quantile Framework for Writing • LearningLink Newsletter • Stamp

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Quantile Teacher Assistant:

Time is short and math instruction needs to be focused. This easy tool helps educators locate resources that can help with instruction and identify those skills that are most relevant to the topic of the daily instruction. This tool has been aligned with state mathematics curriculum standards to make it directly applicable to use in the classroom.

Please follow the three steps below:

1. Select State
2. Select Grade
3. Select Objective

Select your state:

Time is short and math instruction needs to be focused. This easy tool helps educators locate resources that can help with instruction and identify those skills that are most relevant to the topic of the daily instruction. This tool has been aligned with state mathematics curriculum standards to make it directly applicable to use in the classroom.

Please follow the three steps below:

1. Select State
2. Select Grade
3. Select Objective

Select the grade level:

Time is short and math instruction needs to be focused. This easy tool helps educators locate resources that can help with instruction and identify those skills that are most relevant to the topic of the daily instruction. This tool has been aligned with state mathematics curriculum standards to make it directly applicable to use in the classroom.

Please follow the three steps below:

1. Select State
2. Select Grade
3. Select Objective

Select the objective:

Time is short and math instruction needs to be focused. This easy tool helps educators locate resources that can help with instruction and identify those skills that are most relevant to the topic of the daily instruction. This tool has been aligned with state mathematics curriculum standards to make it directly applicable to use in the classroom.

Please follow the three steps below:

1. Select State
2. Select Grade
3. Select Objective

QTaxons and Activities displayed:

North Carolina 5th grade objectives (Quanta)

3.02.1. Sum of the measures of interior angles. Make and test conjectures about polygons.

Select Quantile Range of Your Class

650Q 930Q

3.02.1: Sum of the measures of interior angles. Make and test conjectures about polygons.

Prerequisite QTaxons: Predict results of tessellating, subdividing, and changing shapes by paper folding or dissecting and rearranging pieces of plane figures and solids. (530Q) (view)

Identify diagonals of a polygon. Determine when a diagonal is a line of symmetry. (610Q) (view)

Identify and classify triangles according to the measures of the interior angles and the length of the sides. (610Q) (view)

Name polygons by the number of sides.

QTaxons: Define and identify alternate interior, alternate exterior, corresponding, adjacent and vertical angles. (1010Q) (view)

Define and identify complementary and supplementary angles. (1020Q) (view)

Use a variety of triangles, quadrilaterals, and other polygons to draw conclusions about the sum of the measures of the interior angles. (1070Q) (view)

Use a variety of regular polygons to draw conclusions about the sum of the measures of their sides or angles. (680Q) (view)

Use a variety of regular polygons to draw conclusions about the sum of the measures of the interior angles. (1150Q) (view)

Supplemental QTaxons: Identify intersecting, parallel, skew, and perpendicular lines and line segments. Identify

Sliding bar adjust to your class range:

Select Quantile Range of Your Class

550Q 1060Q

3.02.1: Sum of the measures of interior angles. Make and test conjectures about polygons.

Prerequisite QTaxons: Predict results of tessellating, subdividing, and changing shapes by paper folding or dissecting and rearranging pieces of plane figures and solids. (530Q) (view)

Identify diagonals of a polygon. Determine when a diagonal is a line of symmetry. (610Q) (view)

Identify and classify triangles according to the measures of the interior angles and the lengths of the sides. (610Q) (view)

Name polygons by the number of sides. Distinguish quadrilaterals based on properties of their sides or angles. (680Q) (view)

Identify and label the vertex, rays, and interior and exterior of an angle. Use appropriate naming conventions to identify angles. (750Q) (view)

QTaxons: Define and identify alternate interior, alternate exterior, corresponding, adjacent and vertical angles. (1010Q) (view)

Define and identify complementary and supplementary angles. (1020Q) (view)

Use a variety of triangles, quadrilaterals, and other polygons to draw conclusions about the sum of the measures of the interior angles. (1070Q) (view)

Use a variety of regular polygons to draw conclusions about the sum of the measures of the interior angles. (1150Q) (view)

Supplemental QTaxons: Identify intersecting, parallel, skew, and perpendicular lines and line segments. Identify

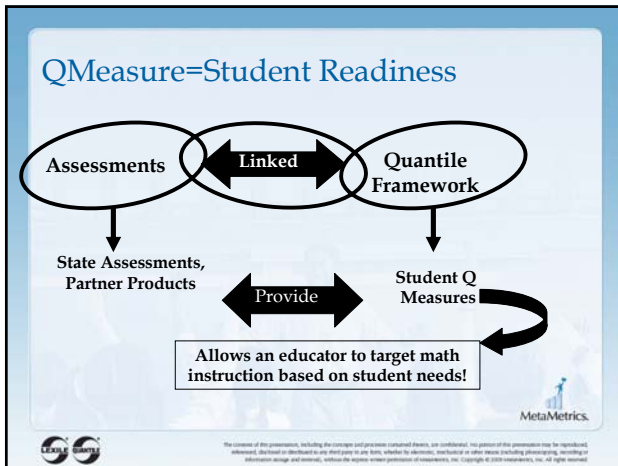
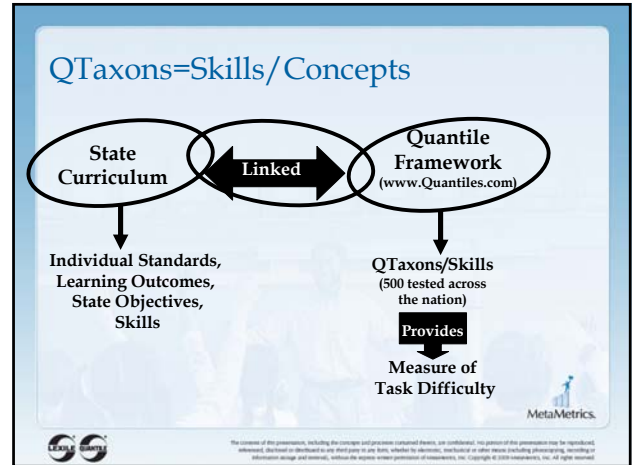
Resources can be:
Downloadable lessons, books, and web sites

Click on the word to reveal meaning!

The screenshot shows a website interface with several sections:

- Downloadable Resources:** Lists resources like 'Classifying Triangles' and 'More Geoboard Triangles (Grade 3)'.
- Supplemental QTaxons:** Includes instructions on how to use regular polygons to draw conclusions about interior angles.
- Vocabulary:** Defines terms like 'triangle', 'equilateral triangle or polygon', 'acute triangle', etc.

 A red box highlights the 'Resources can be:' text, and a red arrow points to a word in the 'Vocabulary' section. Another red arrow points to a 'Click on the word to reveal meaning!' callout box.



In Summary...

The Quantile Framework places the mathematics curriculum, the materials to teach mathematics, and the students themselves ALL on the same scale.

Thus enabling the teacher to

- target instruction
- forecast understanding and
- improve mathematics instruction and achievement.

The MetaMetrics logo is in the bottom right.

Quantiles 101: Thursday @ 9:15AM

Questions?
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