A Correlation of

Pearson
Integrated CME Project
Mathematics III
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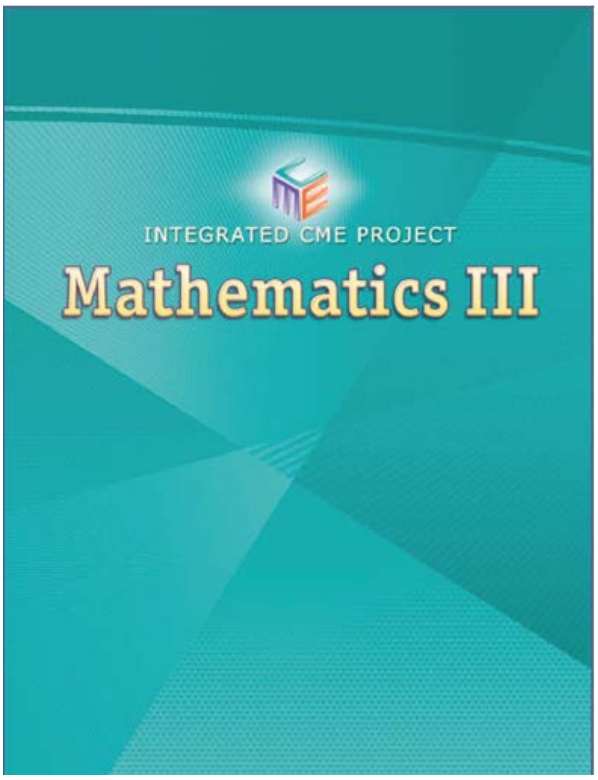

to the

Common Core State Standards for Mathematics - High School
PARRC Model Content Frameworks
Mathematics III

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to the Common Core State Standards for Mathematics
PARRC Model Content Frameworks Mathematics III

Introduction

This document demonstrates how ***Pearson Integrated CME Project*** **Mathematics III ©2013** meets the standards of the *Common Core State Standards for Mathematics, PAARC Model Content Frameworks, Mathematics III.* Correlation references are to the pages of the Student and Teacher's Editions.

The ***Integrated CME Project*** is an NSF-funded core mathematics program that was built for the Integrated Pathway of the Common Core State Standards. It includes content from algebra, geometry, as well as precalculus concepts. The program's proven-effective pedagogy provides the focus, coherence, and rigor necessary to ensure today's students master the challenging new Common Core State Standards. The program also incorporates technology and hands-on projects and activities to engage today's digital students in deep mathematical learning.

Integrated CME Content includes Mathematics I, Mathematics II, and Mathematics III. Each course is focused on big ideas. ***Integrated CME Project*** is organized by coherent chapters. Chapters are comprised of investigation. Each Investigation is then composed of 3-6 lessons. The basic mathematics of each Investigation is accessible to all, and each Investigation can ultimately challenge the best students. The students work from a more informal to formal understanding of the mathematical topic explored in that particular chapter. The Investigation wrap-up, called Mathematical Reflections, provides an opportunity to review and summarize at the end of the chapter—good preparation for the Next-Generation assessments that will require students to justify their conclusions and mathematical understandings in writing. A Chapter Project extends student understanding by presenting challenges and highlighting connections to additional topics—projects are great preparation for performance tasks that will be on the upcoming Next-Generation assessments.

This document demonstrates the high degree of success students will achieve by using ***Pearson Integrated CME Project*** **Mathematics III.**

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Common Core State Standards for Mathematics - High School PARRC Model Content Frameworks Mathematics III	Integrated CME Project, ©2013 Mathematics III
Number and Quantity	
Quantities★ N-Q	
Reason quantitatively and use units to solve problems.	
2. Define appropriate quantities for the purpose of descriptive modeling.	**SE/TE:** 273-274, 275 (#6), 284 (#5), 286 (#15), 292 (#14), 293 (#1), 572-576, 762-767
Algebra	
Seeing Structure in Expressions A-SSE	
Interpret the structure of expressions	
2. Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 – y^4$ as $(x^2)^2 – (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 – y^2)(x^2 + y^2)$.	**SE/TE:** 49, 50 (#5, 12), 51-53, 55-61, 62-68, 73 (#1-3), Honors Appendix: 814-815
Write expressions in equivalent forms to solve problems	
4. Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. For example, calculate mortgage payments.★	For related content, please see: **SE/TE:** 91-94, 139, 143 (#12), 144 (#13-15), 572-576
Arithmetic with Polynomials and Rational Expressions A -APR	
Understand the relationship between zeros and factors of polynomials	
2. Know and apply the Remainder Theorem: For a polynomial p(x) and a number a, the remainder on division by x – a is p(a), so p(a) = 0 if and only if (x – a) is a factor of p(x).	**SE/TE:** 35-40, 523-525, 529-536, 537-542
3. Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.	**SE/TE:** 41-46, 51-54, 55-61, 507-509, 514-515
Use polynomial identities to solve problems	
4. Prove polynomial identities and use them to describe numerical relationships. For example, the polynomial identity $(x^2+ y^2)^2 = (x^2 – y^2)^2 + (2xy)^2$ can be used to generate Pythagorean triples.	**SE/TE:** 46 (#13-14), 449 (#7), 455 (#15)

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Rewrite rational expressions	
6. Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.	**SE/TE:** 40 (#16-17), 69-70, 71-72, 525 (#3-4), 545-548, 549-557, 560, 563-565
Creating Equations★ A -CED	
Create equations that describe numbers or relationships	
1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.	**SE/TE:** 11 (#10)
2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	**SE/TE:** 16 (#14-15), 523-526, 527 (#13-14), 528 (#20), 537-542, 662-667
Reasoning with Equations and Inequalities A -RE I	
Understand solving equations as a process of reasoning and explain the reasoning	
1. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	**SE/TE:** 408-413
2. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.	**SE/TE:** 53 (#4), 67 (#6), 545-546, 547 (#9-10), 548 (#12-13), 736 (#6), 737 (#10), 743 (#2), 744 (#10)
Represent and solve equations and inequalities graphically	
11. Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.★	SE/TE: 17-21, 25-27, 28 (#6-9), 54 (#8), 520-528, 537-538, 541 (#1-2), 542 (#12), 592-599, 642-647

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Functions	
Interpreting Functions F-IF	
Interpret functions that arise in applications in terms of the context	
4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.★	**SE/TE:** 317, 335-336, 338 (#3), 414-417, 421-422, 424-428, 429-431, 432-439, 440 (#16-18), 441 (#1, 3), 510-511, 512 (#6-7), 514, 520-522, 525, 527, 528 (#15, 17-18), 537-538, 549-551, 554 (#3-4), 555 (#8-10), 557 (#19-20), 592-597, 599 (#22), 642-647, 676, 678 (#7)
6. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.★	**SE/TE:** 520-522, 524 (#1), 526, 537-540, 649-652, 655 (#12)
Analyze functions using different representations	
7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.★	**SE/TE:** 13, 15 (#12), 16, 27 (#1-2), 28 (#6-9), 333 (#8), 335-336, 337 (#1), 338 (#3-5), 342 (#5), 403-405, 406 (#3, 7), 407 (#9-11), 416 (#1-5), 417 (#8-10, 14), 421, 424-428, 429-430, 431 (#9), 432-436, 437, 438 (#5-6, 9), 439 (#12, 14), 440 (#18), 507-509, 510-512, 514, 520-522, 525, 527, 528 (#15, 17-18), 537-540, 545-547, 548 (#14-16), 549-553, 555 (#8-9), 556 (#13, 15-17), 557 (#19, 22), 592-597, 599 (#22), 642-643, 644 (#3), 646 (#10-11, 13), 647 (#16), 670, 672 (#6), Honors Appendix: 782-784, 785 (#3, 5), 787-790, 794-795, 798 (#9)
c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.	**SE/TE:** 13, 14 (#12), 16 (#14-18), 25, 27 (#1-2), 28 (#6-9), 507-508, 509 (#10-11, 13), 510-514, 517 (#14), 521-522, 525 (#2-4), 527 (#10-12, 14), 528 (#15, 17-18)536 (#17), 537-538

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Common Core State Standards for Mathematics - High School PARRC Model Content Frameworks Mathematics III	**Integrated CME Project, ©2013 Mathematics III**
e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.	**SE/TE:** 333 (#8), 335-336, 338-339, 340-342, 403-405, 406 (#7), 407 (#10-11), 414-415, 416-417, 424-428, 429-430, 431 (#9), 432-439, 440 (#16, 18), 441 (#1, 3), 592-596, 597 (#8), 599 (#22), 627, 632 (#5), 642-643, 644 (#3), 646 (#11, 13), 647 (#16), 649-652, 653-654, 655 (#9, 12-13), 656 (15-16), 659 (3-4), 660 (#7), 661 (#8), 670, 672 (#6), 674 (#6), 676 (#10)
9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.	For related content, please see: **SE/TE:** 79-81, 82, 84 (#11), 416 (#6), 417 (#14)
Building Functions F-BF	
Build new functions from existing functions	
3. Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.	For related content, please see: **SE/TE:** 338 (#11-12), 406 (#4, 7), 407 (#10, 12), 421, 422 (#11), 423 (#12), 428, 429 (#7), 430-431, 435-436, 437, 438 (#5-8), 439, 440 (#18), 509 (#10-11, 13), 525-526, 599 (#22), 608 (#1), 613 (#13)
4. Find inverse functions.	**SE/TE:** 616-617, 618 (#4), 623 (#5, 7), 680-681, 685 (#15), Honors Appendix: 775 (#1, 3-4), 787-790
a. Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. For example, $f(x) = 2x^3$ or $f(x) = (x+1)/(x-1)$ for $x \neq 1$.	For related content, please see: **SE/TE:** 617, 618 (#4), 623 (#5, 7), 675-679, 787-793
Linear, Quadratic, and Exponential Models★ F -LE	
Construct and compare linear, quadratic, and exponential models and solve problems	
4. For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.	**SE/TE:** 627-630, 632 (#16-17, 21-22), 633-640, 668-673

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Trigonometric Functions F-TF	
Extend the domain of trigonometric functions using the unit circle	
1. Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.	**SE/TE:** 395-396, 397-399, 400, 407 (#15-16)
2. Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle	**SE/TE:** 316-321, 395-396, 397-402, 403-407
Model periodic phenomena with trigonometric functions	
5. Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.★	For related content, please see: **SE/TE:** 333 (#6, 8), 335-336, 422, 533-536, 437 (#2), 438 (#6, 9), 439 (#12), 440 (#18), 441 (#1, 3)
Prove and apply trigonometric identities	
8. Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to find $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ given $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ and the quadrant of the angle.	**SE/TE:** 322-326, 410-411, 412-413, Honors Appendix: 798, 801-803, 810-815
Geometry	
Congruence G-CO	
Make geometric constructions	
12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). *Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.*	Please see: **Integrated CME Project Mathematics I** **SE/TE:** 575-576, 577-580, 580 (#1), 581-583, 584-585, 587-588, 589-591, 593-594, 596 (#10) **Integrated CME Project Mathematics II** **SE/TE:** 429 (#4-8), 430 (#1-2), 439 (#8-9), 440 (#1-4), 442 (#10)

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13. Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.	Please see: **Integrated CME Project Mathematics I SE/TE:** 592-593, 596 (#14), 597 (#1) **Integrated CME Project Mathematics II SE/TE:** 635-639
Circles G-C	
Understand and apply theorems about circles	
1. Prove that all circles are similar.	For related content, please see: **Integrated CME Project Mathematics II SE/TE:** 654
2. Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.	Please see: **Integrated CME Project Mathematics II SE/TE:** 441, 663-665, 666-668, 669 (#1), 674-679, 686-692
3. Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.	For related content, please see: **SE/TE:** 397
Find arc lengths and areas of sectors of circles	
5. Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.	**SE/TE:** 397-399, 401 (#12), 402 (#15-16)
Expressing Geometric Properties with Equations G-GPE	
Translate between the geometric description and the equation for a conic section	
1. Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.	Please see: **Integrated CME Project Mathematics II SE/TE:** 802-803, 825 (#2), 827 (#8)

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2. Derive the equation of a parabola given a focus and directrix.	**SE/TE:** 693-694, 742, 745-746, 752 (#6-7), 762-763
Use coordinates to prove simple geometric theorems algebraically	
4. Use coordinates to prove simple geometric theorems algebraically. *For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, √3) lies on the circle centered at the origin and containing the point (0, 2).*	For related content, please see: **SE/TE:** 692-697
5. Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).	For related content, please see: **SE/TE:** 692-693
6. Find the point on a directed line segment between two given points that partitions the segment in a given ratio.	Please see: **Integrated CME Project Mathematics I** **SE/TE:** 664-665, 666 (#2, 5-6), 678 (#12), Honors Appendix: 716 (#21) Also for related content, please see: **Integrated CME Project Mathematics II** **SE/TE:** 560 (#11-13), 728-734, 769-770
7. Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.★	For related content, please see: **Integrated CME Project Mathematics I** For related content, please see: **SE/TE:** 662-664, 666 (#2-3), 678 (#8)
Geometric Measurement and Dimension G-GMD	
Visualize relationships between two-dimensional and three dimensional objects	
4. Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.	For related content, please see: **SE/TE:** 735, 736 (#7-8), 738-742

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Modeling with Geometry G-MG	
Apply geometric concepts in modeling situations	
1. Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).★	For related content, please see: **Integrated CME Project** **Mathematics II** **SE/TE:** 443 (#13), 707-709, 767 (#5-8), 768 (#9-12)
2. Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).★	**SE/TE:** 731 (#2), 733 (#8)
3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).★	**SE/TE:** 719-723, 725-727
Statistics and Probability	
Interpreting Categorical and Quantitative Data S-ID	
Summarize, represent, and interpret data on a single count or measurement variable	
4. Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.	**SE/TE:** 273-275, 277-283, 284 (#5), 286 (#13), 287-290, 291-292
Recognize possible associations and trends in the data.	
6. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.	Please see: **Integrated CME Project** **Mathematics I** **SE/TE:** 511-514, 515-519, 528-531, 533 (#4)
a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.	Please see: **Integrated CME Project** **Mathematics I** **SE/TE:** 523-524, 525-527, 529-530, 532 (#3), 534 (#8)

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b. Informally assess the fit of a function by plotting and analyzing residuals.	This standard is outside the scope of Integrated CME.
Making Inferences and Justifying Conclusions S-IC	
Understand and evaluate random processes underlying statistical experiments	
1. Understand statistics as a process for making inferences about population parameters based on a random sample from that population.	**SE/TE:** 209-210, 235-236, 237-239, 243, 245 (#7, 9), 291 (#1-2)
2. Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?	For related content, please see: **SE/TE:** 175-176, 227-232, 235-236, 291 (#5)
Make inferences and justify conclusions from sample surveys, experiments, and observational studies	
3. Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.	**SE/TE:** 237-246, 252, 253, 254, 255, 258 (#9), 259 (#12)
4. Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.	For related content, please see: **SE/TE:** 209-210, 235-236, 252-255, 256 (#5), 257 (#6), 258 (#8), 261-265, 266-270
5. Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.	**SE/TE:** 237-239, 240-246, 255 (#1), 256 (#3-4), 258 (#10, 12)
6. Evaluate reports based on data.	**SE/TE:** 237-239, 240-246, 255 (#2), 257 (#6), 258 (#10-11), 287-292

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