

BENCHMARK COMPLEXITY REPORT

MATHEMATICS GRADE 7



Key: OCS Code = The benchmark code. Consists of Grade (K-8), Domain (2-3 character alpha code), Strand (1-3 character alpha code), Standard (1-9), Benchmark Number (1 or 1-1 and up), and Complexity (a, b, c).
Benchmark = The wording of the benchmark.
CCSS Code = Common Core State Standards, developed by National Governors Association Center for Best Practices, Council of Chief State School Officers (www.corestandards.org).
CRS Strand = ACT College Readiness Standards developed by ACT, Inc. (www.act.org).
The CRS Strands are: BOA = Basic Operations & Applications, PSD = Probability/Statistics/Data, NCP = Numbers/Concepts/Properties, XEI = Expression/Equation & Inequality, GRE = Graphical Representations, PPF = Properties of Plane Figures, MEA = Measurement, FUN = Functions.

| a. Low Complexity | | | | b. Intermediate Complexity | | | | c. High Complexity | | | |
|---|--|-----------|------------|----------------------------|---|-----------|------------|--------------------|---|-----------|------------|
| OCS Code | Benchmark | CCSS Code | CRS Strand | OCS Code | Benchmark | CCSS Code | CRS Strand | OCS Code | Benchmark | CCSS Code | CRS Strand |
| DOMAIN: Standards for Mathematical Content | | | | | | | | | | | |
| Ratios and Proportional Relationships | | | | | | | | | | | |
| 7.SMC.RP.1.1.a | Compute unit rates associated with ratios of fractions | 7.RP.A.1 | BOA | 7.SMC.RP.1.2-2.b | Identify the constant of proportionality or unit rate in a variety of contexts | 7.RP.A.2b | BOA | 7.SMC.RP.1.2-4.c | Describe what a point (x, y) on the graph of a proportional relationship means in terms of the context | 7.RP.A.2d | GRE |
| 7.SMC.RP.1.2-1.a | Determine the proportional relationship between two quantities | 7.RP.A.2a | BOA | 7.SMC.RP.1.2-3.b | Represent proportional relationships by writing an equation | 7.RP.A.2c | BOA | 7.SMC.RP.1.3.c | Use proportional relationships to solve multistep ratio and percent problems | 7.RP.A.3 | BOA |
| The Number System | | | | | | | | | | | |
| 7.SMC.NS.1.1-1.a | Describe situations in which opposite quantities combine to make 0 | 7.NS.A.1a | NCP | 7.SMC.NS.1.1-2.b | Recognize $p + q$ as the number located a distance $ q $ from p | 7.NS.A.1b | NCP | 7.SMC.NS.1.1-7.c | Apply the principle of absolute value difference in real world contexts | 7.NS.A.1c | NCP |
| 7.SMC.NS.1.1-3.a | Show that a number and its opposite have a sum of zero | 7.NS.A.1b | NCP | 7.SMC.NS.1.1-4.b | Interpret sums of rational numbers by describing real world contexts | 7.NS.A.1b | NCP | 7.SMC.NS.1.1-8.c | Add and subtract rational numbers using properties of operations | 7.NS.A.1d | NCP |
| | | | | 7.SMC.NS.1.1-5.b | Recognize subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$ | 7.NS.A.1c | NCP | 7.SMC.NS.1.2-2.c | Interpret products of rational numbers in real world contexts | 7.NS.A.2a | BOA |
| | | | | 7.SMC.NS.1.1-6.b | Show that the distance between two rational numbers on a number line is the absolute value of their difference | 7.NS.A.1c | GRE | 7.SMC.NS.1.2-5.c | Interpret quotients of rational numbers in real world contexts | 7.NS.A.2b | NCP |
| | | | | 7.SMC.NS.1.2-1.b | Show that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations | 7.NS.A.2a | BOA | 7.SMC.NS.1.2-6.c | Multiply and divide rational numbers by applying properties of operations | 7.NS.A.2c | BOA |
| | | | | 7.SMC.NS.1.2-3.b | Divide integers with non-zero divisors | 7.NS.A.2b | NCP | 7.SMC.NS.1.3.c | Solve real world and mathematical problems using the four operations with rational numbers | 7.NS.A.3 | BOA |
| | | | | 7.SMC.NS.1.2-4.b | Recognize that every quotient of integers with a non-zero divisor is a rational number | 7.NS.A.2b | NCP | | | | |
| | | | | 7.SMC.NS.1.2-7.b | Convert a rational number to a decimal using long division | 7.NS.A.2d | NCP | | | | |
| | | | | 7.SMC.NS.1.2-8.b | Show that the decimal form of a rational number terminates in zeros or eventually repeats | 7.NS.A.2d | NCP | | | | |
| Expressions and Equations | | | | | | | | | | | |
| | | | | 7.SMC.EE.1.1-1.b | Add and subtract linear expressions with rational coefficients using properties of operations | 7.EE.A.1 | XEI | 7.SMC.EE.2.1-1.c | Solve multi-step real-life and mathematical problems using positive and negative rational numbers in any form, including whole numbers, fractions, and decimals | 7.EE.B.3 | BOA |
| | | | | 7.SMC.EE.1.1-2.b | Factor linear expressions with rational coefficients using properties of operations | 7.EE.A.1 | XEI | 7.SMC.EE.2.1-2.c | Calculate with positive and negative rational numbers in any form using properties of operations | 7.EE.B.3 | BOA |
| | | | | 7.SMC.EE.1.1-3.b | Expand linear expressions with rational coefficients using properties of operations | 7.EE.A.1 | XEI | 7.SMC.EE.2.1-3.c | Convert between numeric forms using properties of operations | 7.EE.B.3 | BOA |
| | | | | 7.SMC.EE.1.2.b | Solve problems by rewriting an expression in different forms | 7.EE.A.2 | XEI | 7.SMC.EE.2.1-4.c | Assess the reasonableness of solutions by mentally computing and estimating with positive and negative rational numbers | 7.EE.B.3 | BOA |
| | | | | | | | | 7.SMC.EE.2.2-1.c | Solve word problems leading to equations of the form $px + q = r$, where p , q , and r are specific rational numbers | 7.EE.B.4a | XEI |
| | | | | | | | | 7.SMC.EE.2.2-2.c | Solve word problems leading to equations of the form $p(x + q) = r$, where p , q , and r are specific rational numbers | 7.EE.B.4a | XEI |
| | | | | | | | | 7.SMC.EE.2.2-3.c | Compare the algebraic and arithmetic solutions to word problems by showing the sequence of operations used in each approach | 7.EE.B.4a | XEI |

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| | | | | | | | | 7.SMC.EE.2.2-4.c | Solve word problems leading to inequalities of the form $px + q > r$, where p , q , and r are specific rational numbers | 7.EE.B.4b | XEI |
| | | | | | | | | 7.SMC.EE.2.2-5.c | Solve word problems leading to inequalities of the form $px + q < r$, where p , q , and r are specific rational numbers | 7.EE.B.4b | XEI |
| | | | | | | | | 7.SMC.EE.2.2-6.c | Solve word problems by graphing the solution set of an algebraic inequality | 7.EE.B.4b | GRE |
| | | | | | | | | 7.SMC.EE.2.2-7.c | Interpret a graph showing the solution set of an algebraic inequality in the context of a word problem | 7.EE.B.4b | GRE |
| Geometry | | | | | | | | | | | |
| 7.SMC.G.1.1-1.a | Solve problems involving scale drawings of geometric figures | 7.G.A.1 | MEA | 7.SMC.G.1.2.b | Draw geometric shapes with given conditions | 7.G.A.2 | MEA | 7.SMC.G.1.3.c | Describe the two-dimensional figures that result from slicing three-dimensional figures | 7.G.A.3 | MEA |
| 7.SMC.G.1.1-2.a | Reproduce a scale drawing using a different scale | 7.G.A.1 | MEA | 7.SMC.G.2.2-1.b | Write equations for an unknown angle in a figure in a multi-step problem | 7.G.B.5 | PPF | 7.SMC.G.2.3-1.c | Solve real world and mathematical problems involving area of two- and three-dimensional objects | 7.G.B.6 | MEA |
| 7.SMC.G.2.1-1.a | Memorize the formulas for the area and circumference of a circle | 7.G.B.4 | MEA | 7.SMC.G.2.2-2.b | Solve equations for an unknown angle in a figure using facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem | 7.G.B.5 | PPF | 7.SMC.G.2.3-2.c | Solve real world and mathematical problems involving volume of two- and three-dimensional objects | 7.G.B.6 | MEA |
| 7.SMC.G.2.1-2.a | Solve problems using the formulas for the area and circumference of a circle | 7.G.B.4 | MEA | | | | | 7.SMC.G.2.3-3.c | Solve real world and mathematical problems involving surface area of two- and three-dimensional objects | 7.G.B.6 | MEA |
| Statistics and Probability | | | | | | | | | | | |
| 7.SMC.SP.1.1-1.a | Compare the characteristics of a sample to a statistical population | 7.SP.A.1 | PSD | 7.SMC.SP.1.2-1.b | Use data from a random sample to draw inferences about a population | 7.SP.A.2 | PSD | 7.SMC.SP.3.4-4.c | Design a simulation to generate frequencies for compound events | 7.SP.C.8c | PSD |
| 7.SMC.SP.1.1-2.a | Determine under which conditions a sample is representative of a population | 7.SP.A.1 | PSD | 7.SMC.SP.1.2-2.b | Compare multiple or simulated samples of the same size to determine the variation in an estimate or prediction | 7.SP.A.2 | PSD | 7.SMC.SP.3.4-5.c | Use a simulation to generate frequencies for compound events | 7.SP.C.8c | PSD |
| 7.SMC.SP.1.1-3.a | Determine under which conditions information obtained from a sample can support valid inferences | 7.SP.A.1 | PSD | 7.SMC.SP.2.1-1.b | Compare the visual overlap of two numerical data distributions with similar variabilities | 7.SP.B.3 | PSD | | | | |
| 7.SMC.SP.3.1.a | Show that the likelihood or probability of a chance event occurring is a number between 0 and 1 | 7.SP.C.5 | PSD | 7.SMC.SP.2.1-2.b | Measure the difference between the centers of two overlapping numerical data distributions by expressing the difference as a multiple of a measure of variability | 7.SP.B.3 | PSD | | | | |
| 7.SMC.SP.3.4-1.a | Show that the probability of a compound event is the fraction of outcomes in the sample space for which the event occurs | 7.SP.C.8a | PSD | 7.SMC.SP.2.2-1.b | Use measures of center and variability for numerical data from random samples to draw informal comparative inferences about two populations | 7.SP.B.4 | PSD | | | | |
| | | | | 7.SMC.SP.2.2-2.b | Draw inferences from two populations by comparing measures of center and variability for numerical data from random samples | 7.SP.B.4 | PSD | | | | |
| | | | | 7.SMC.SP.3.2-1.b | Approximate the probability of a chance event occurring by collecting data on the chance process that produces it | 7.SP.C.6 | PSD | | | | |
| | | | | 7.SMC.SP.3.2-2.b | Approximate the probability of a chance event occurring by observing its long-run relative frequency | 7.SP.C.6 | PSD | | | | |
| | | | | 7.SMC.SP.3.2-3.b | Predict the approximate relative frequency given the probability of a chance event | 7.SP.C.6 | PSD | | | | |
| | | | | 7.SMC.SP.3.3-1.b | Develop a uniform probability model by assigning equal probability to all outcomes of an event | 7.SP.C.7a | PSD | | | | |
| | | | | 7.SMC.SP.3.3-2.b | Use a uniform probability model to determine the probabilities of an event | 7.SP.C.7a | PSD | | | | |
| | | | | 7.SMC.SP.3.3-3.b | Develop a non-uniform probability model by observing frequencies in data generated from a chance process | 7.SP.C.7b | PSD | | | | |

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| | | | | 7.SMC.SP.3.4-2.b | Create a list, table, or tree diagram to represent sample spaces for compound events | 7.SP.C.8b | PSD | | | | |
| | | | | 7.SMC.SP.3.4-3.b | Describe the outcomes of a compound event in everyday language, by analyzing a sample space which composes an event | 7.SP.C.8b | PSD | | | | |
| DOMAIN: Standards for Mathematical Practices | | | | | | | | | | | |
| Solve Problems | | | | | | | | | | | |
| | | | | | | | | 7.SMP.1.c | Make sense of problems and persevere in solving them | MP1 | |
| Reason | | | | | | | | | | | |
| | | | | | | | | 7.SMP.2.c | Reason abstractly and quantitatively | MP2 | |
| Construct Arguments | | | | | | | | | | | |
| | | | | | | | | 7.SMP.3.c | Construct viable arguments and critique the reasoning of others | MP3 | |
| Model | | | | | | | | | | | |
| | | | | | | | | 7.SMP.4.c | Model with mathematics | MP4 | |
| Use Tools | | | | | | | | | | | |
| | | | | | | | | 7.SMP.5.c | Use appropriate tools strategically | MP5 | |
| Attend to Precision | | | | | | | | | | | |
| | | | | | | | | 7.SMP.6.c | Attend to precision | MP6 | |
| Use Structure | | | | | | | | | | | |
| | | | | | | | | 7.SMP.7.c | Look for and make use of structure | MP7 | |
| Express Regularity | | | | | | | | | | | |
| | | | | | | | | 7.SMP.8.c | Look for and express regularity in repeated reasoning | MP8 | |