# PRACTICE TEST ALIGNMENT DOCUMENT

## Grade 7 Math

| Item Number | Standards |
|---|---|
| 1 | 07.G.02.04<br>Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle. |
| 2 | 07.NS.01.02.b<br>Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If $p$ and $q$ are integers, then $–(p/q) = (–p)/q = p/(–q)$. Interpret quotients of rational numbers by describing real-world contexts. |
| 3 | 07.EE.02.04.a<br>Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where $p$, $q$, and $r$ are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. *For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?* |
| 4 | 07.RP.01.02.a<br>Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. |
| 5 | 07.SP.03.05<br>Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event. |
| 6 | 07.SP.03.08.a<br>Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. |
| 7 | 07.RP.01.01<br>Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. *For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction 1/2 ÷ 1/4 miles per hour, equivalently 2 miles per hour.* |
| 8 | 07.EE.01.02<br>Demonstrate that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. *For example, a+0.05a=1.05a means that “increase by 5%” is the same as “multiply by 1.05.”* |

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| 9* | 07.SP.03.07.a<br>Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. *For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.* |
| 10 | 07.RP.01.01<br>Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. *For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction 1/2 ÷ 1/4 miles per hour, equivalently 2 miles per hour.* |
| 11 | 07.NS.01.02.c<br>Apply properties of operations as strategies to multiply and divide rational numbers. |
| 12 | 07.G.02.05<br>Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure. |
| 13 | 07.RP.01.02<br>Recognize and represent proportional relationships between quantities. |
| 14 | 07.NS.01.03<br>Solve real-world and mathematical problems involving the four operations with rational numbers. (Computations with rational numbers extend the rules for manipulating fractions to complex fractions.) |
| 15* | 07.EE.02.04.a<br>Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where $p$, $q$, and $r$ are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. *For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?* |
| 16 | 07.EE.01.02<br>Demonstrate that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. *For example, a+0.05a=1.05a means that "increase by 5%" is the same as "multiply by 1.05."* |
| 17 | 07.G.01.01<br>Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. |
| 18 | 07.G.02.06<br>Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. |
| 19 | 07.EE.01.01<br>Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. |
| 20 | 07.RP.01.02.b<br>Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. |
| 21 | 07.EE.02.04.b<br>Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where $p$, $q$, and $r$ are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. *For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.* |

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| 22 | 07.SP.02.04<br>Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. *For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book*. |
| 23 | 07.SP.03.08.c<br>Design and use a simulation to generate frequencies for compound events. *For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?* |
| 24 | 07.NS.01.01.c<br>Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts. |
| 25 | 07.EE.02.04.b<br>Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where $p$, $q$, and $r$ are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. *For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.* |
| 26 | 07.SP.01.01<br>Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences. |
| 27 | 07.EE.02.03<br>Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. *For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.* |
| 28 | 07.G.01.02<br>Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle. |
| 29* | 07.G.02.04<br>Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle. |
| 30 | 07.NS.01.03<br>Solve real-world and mathematical problems involving the four operations with rational numbers. (Computations with rational numbers extend the rules for manipulating fractions to complex fractions.) |

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| 31 | 07.NS.01.03<br>Solve real-world and mathematical problems involving the four operations with rational numbers. (Computations with rational numbers extend the rules for manipulating fractions to complex fractions.) |
| 32 | 07.SP.01.02<br>Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be. |
| 33 | 07.SP.03.08.b<br>Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event. |
| 34 | 07.RP.01.02.d<br>Explain what a point (*x*, *y*) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, *r*) where *r* is the unit rate. |
| 35* | 07.EE.02.03<br>Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. *For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.* |
| 36 | 07.RP.01.03<br>Use proportional relationships to solve multistep ratio and percent problems. *Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.* |
| 37 | 07.SP.02.04<br>Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. *For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.* |
| 38 | 07.EE.02.03<br>Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. *For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.* |

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| 39 | 07.RP.01.02.d<br>Explain what a point (*x*, *y*) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, *r*) where *r* is the unit rate. |
| 40 | 07.G.02.06<br>Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. |

* Please refer to Rubric below for Scoring Information.

#9

**Concepts and Procedures Scoring Rubric:**

| Score | Description |
|---|---|
| 2 | The student earns 2 points. |
| 1 | The student earns 1 point. |
| 0 | Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured. |
| Blank | No response |

**Training Notes:**

2 points for correct answer, $\frac{36}{120}$ or equivalent, with sufficient work or explanation to indicate understanding of developing a uniform probability model by assigning equal probability to all outcomes, and using the model to determine probabilities of events

OR

1 point for correct answer with insufficient work or explanation OR for sufficient work or explanation to indicate understanding of developing a uniform probability model by assigning equal probability to all outcomes, and using the model to determine probabilities of events with incorrect or no answer

**Mathematical Practices Scoring Rubric:**

| Score | Description |
|---|---|
| 1 | The student earns 1 point. |
| 0 | Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured. |
| Blank | No response |

**Training Notes:**

1 point for interpreting and analyzing a model (demonstrates understanding and using information from the model)

**Exemplary Response:**

The seventh grade has 36 students and there is a total of 120 students at the school. Therefore, the probability that the student chosen is a seventh-grade student is $\frac{20+16}{20+24+20+16+24+16} = \frac{36}{120}$.

#15

**Concepts and Procedures Scoring Rubric**

| Score | Description |
|---|---|
| 4 | The student earns 4 points. |
| 3 | The student earns 3 points. |
| 2 | The student earns 2 points. |
| 1 | The student earns 1 point. |
| 0 | The student earns 0 points. |
| Blank | No response. |

**Concepts and Procedures Training Notes:**

| | |
|---|---|
| Part a 1 point | for correct answer, $8w + 8$, or equivalent |
| Part b 2 points | for correct answer, 88 (units), or equivalent with sufficient work or explanation that indicates an understanding of how to solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$ |
| 1 point | for correct answer with insufficient or no work or explanation shown<br>or<br>for appropriate strategy that indicates an understanding of how to solve word problems with incorrect or no answer |
| Part c 1 point | for correct answer, 17 (units), or equivalent |

**Mathematical Practices Scoring Rubric**

| Score | Description |
|---|---|
| 2 | The student earns 2 points. |
| 1 | The student earns 1 point. |
| 0 | The student earns 0 points. |
| Blank | No response. |

**Mathematical Practices Training Notes:**

| | |
|---|---|
| 1 point | for abstracting a given situation and representing it symbolically (simplifying the equation to represent the perimeter of the rectangle in terms of its width in part (a)) |
| 1 point | for knowing and flexibly using different properties of operations (showing correct work or explanation in part (c)) |

**Exemplary Response:**

a. $8w + 8$; The perimeter of any rectangle can be found using the equation $P = 2(l + W)$. Since the length of the rectangle is 4 more than 3 times its width, we can replace l with the expression $4 + 3w$, resulting in the equation $P = 2(4 + 3w + w)$. Simplifying this equation gives $P = 2(4 + 4w)$ or $P = 8 + 8w$.

b. 88 units; If the width of the rectangle is 10 units, then the perimeter can be found by solving the equation, $P = 8 + 8(10)$ and solving for $P$.

c. 17 units; I can use the equation $P = 2(l + w)$ and substitute 64 for $P$ and 15 for $l$ to get: $64 = 2(15 + w)$. Solving for $w$: $32 = 15 + w$, and $w = 17$.

#29

**Concepts and Procedures Scoring Rubric**

| Score | Description |
|---|---|

| | |
|---|---|
| 2 | The student earns 2 points. |
| 1 | The student earns 1 point. |
| 0 | The student earns 0 points. |
| Blank | No response. |

**Concepts and Procedures Training Notes:**

Part a — See Mathematical Practices scoring rubric and training notes.

Part b — 2 points — for correct answer, 251.2 or $80\pi$, or equivalent with sufficient work or explanation to indicate understanding or knowing the formulas for the area and circumference of a circle

OR

1 point — for correct answer with insufficient or no work or explanation

OR

for appropriate strategy that indicates understanding or knowing the formulas for the area and circumference of a circle with incorrect or no answer

**Mathematical Practices Scoring Rubric**

| Score | Description |
|---|---|
| 2 | The student earns 2 points. |
| 1 | The student earns 1 point. |
| 0 | The student earns 0 points. |
| Blank | No response. |

**Mathematical Practices Training Notes:**

1 point — for responding to the arguments of others (explaining the error that was made involves subtracting the radii of both circles and then squaring the result in part (a))

**Exemplary Response:**

a. Paul used the difference of the radii to find the area when he needed to find the area of each circle separately and then find the difference.

b. The correct answer is the difference of the areas of the circles. The greater area minus the lesser area will yield the area between the circles: $A=\pi(12)2-\pi(8)2=144\pi-64\pi=80\pi$ or 3.14(80) = 251.2 square centimeters.

#35

**Concepts and Procedures Scoring Rubric:**

| Score | Description |
|---|---|
| 4 | The student earns 6 points. |
| 3 | The student earns 4 or 5 points. |
| 2 | The student earns 2 or 3 points. |
| 1 | The student earns 1 point. |
| 0 | Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured. |
| Blank | No response. |

**Training Notes:**

Part a 2 points for correct answer, $\frac{3}{30}$, or equivalent, with sufficient work or explanation to indicate understanding of solving multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically

OR

1 point for correct answer with insufficient or no work or explanation OR for appropriate strategy that shows understanding of solving multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically with incorrect or no answer

Part b 2 points for correct answer, $85,200, or a correct answer based on an incorrect answer in part (a) with sufficient work or explanation that shows understanding of solving multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically

OR

1 point for correct answer or a correct answer based on an incorrect answer in part (a) with insufficient or no work or explanation OR for appropriate strategy that shows understanding of solving multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically with incorrect or no answer

Part c 2 points for correct answer, $18,750, with sufficient work or explanation that shows understanding solving multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically

OR

1 point for correct answer with insufficient or no work or explanation OR for appropriate strategy that shows understanding of solving multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically with incorrect or no answer

**Mathematical Practices Scoring Rubric:**

| Score | Description |
|---|---|
| 2 | The student earns 2 points. |
| 1 | The student earns 1 point. |
| 0 | Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured. |
| Blank | No response. |

**Training Notes:**

1 point for making sense of quantities (demonstrating understanding of the relationship between the fractional budgeted amounts)

1 point for contextualizing (using the relationships between the fractional budgeted amounts, the total budget amount, and the individual budget amounts)

**Exemplary Response:**

a. $\frac{2}{5}+\frac{1}{3}+\frac{1}{6}=\frac{12+10+5}{30}=\frac{27}{30}=\frac{9}{10}$; $1-\frac{9}{10}=\frac{1}{10}$

b. $85,200;

$\frac{1}{10}x=8{,}520$

$\left(\frac{10}{1}\right)\frac{1}{10}x=8{,}520$

$x=85{,}200$

c. $18,750;

$\frac{2}{5}y=45{,}000$

$\left(\frac{5}{2}\right)\frac{2}{5}y=45{,}000\left(\frac{5}{2}\right)$

$y=112{,}500$

$112{,}500\cdot\frac{1}{6}=18{,}750$