STUDENT READINESS
ASSESSMENT ITEM
RELEASE GUIDE
STUDENT EDITION
GRADE 7 MATHEMATICS
Introduction
The state-mandated school closures through the end of the 2019-2020 school year not only changed the way schools delivered instruction but impacted how students were expected to learn grade-level and course content. As districts prepare for the 2020-2021 school year, the Ohio Department of Education is providing a series School Readiness Toolkits to help educators reflect on their instructional practices and support them in determining where their students are in their acquisition and retention of knowledge and skills.

Background
The items contained in the School Readiness Toolkits have been selected from the pool of released items from previous spring administrations of Ohio’s State Tests. The items are grouped together by Reporting Category and Critical Area of Focus. The collection of items as a whole is not representative of a single test form. The items presented are selected to offer a range of opportunity to work with each reporting category but do not comprise an actual test statistically. They are chosen to offer a range of experience with items of varying levels of difficulty or complexity. Items contained in School Readiness Toolkits are reflective of the 2017 Ohio’s Learning Standards for Mathematics. All items satisfy the criteria set forth by the grade-level/course Test Specifications and Content Elaborations and Expectations for Learning established by the grade-level/course Model Curriculum.

How These Items Can Be Used
The School Readiness Toolkits documents can be used to support instruction in a variety of ways. Districts can choose to administer the:

- Previous grade-level School Readiness Toolkits to acquire data and gather information on student understanding of previous grade-level content to begin the new school year;
- Current grade level School Readiness Toolkits items in sections as pre-assessments based on the grade level/course Critical Areas of Focus or local unit of study;
- Current grade-level School Readiness Toolkits in their entirety;
- Problems may be individually selected for use during local instruction; or
- Problems may be selected for use on local assessments.

How to Identify Released Items
At the bottom of the page for each released item, there is a page number and year. For example: 3 (2018), identifies the item can be found on page 3 of the 2018 Released Item document for the grade level or course. Released Item Scoring Guides for Mathematics are available in the Test Portal in the Student Practice Resources for Mathematics folder under the Student Practice Resources.

The released item Release Scoring Guides sample responses and scoring rationales can help educators plan and deliver instruction by providing example responses for each question along with scoring rationales for each response.

- [2017 Item Release Scoring Guide Grade 7](#)
- [2018 Item Release Scoring Guide Grade 7](#)
- [2019 Item Release Scoring Guide Grade 7](#)
Using Released Test Items to Plan Instruction after COVID-19

The following questions can be answered individually or as a teacher team in the review of the state-released items and subsequent reflection on the local curriculum, instructional practices and assessments (both formative and summative), along with the previous learning opportunities for students.

- What are the math concepts evident in the release item(s)?
  - What is the math a student needs to know in this item?
  - Specifically, what previous grade-level standards impact the ability to answer this item?

- What math strategies can a student use to answer the item?
  - Identify examples of how these can be included in your instruction.

- Does the item focus on procedural fluency or conceptual understanding?
  - Procedural fluency follow-up:
    - What are the procedures and/or skills a student needs to know?
    - What experiences do students have to be prepared to demonstrate this learning?
    - What experiences can be used to move toward the desired outcome(s)?

- Conceptual understanding follow-up:
  - What mathematical understanding is evident in the item?
  - What tasks can be used to develop that mathematical understanding?

- Does the item require the student to make connections across standards? If so, what are they?
  - What previous grade-level expectations are evident in the item?
  - What experiences can improve a student’s ability to demonstrate these learning expectations?

- Which Standards for Mathematical Practice are most evident in the item?
  - What types of experiences will improve student success?
Preparing for Instruction

Identify a grade-level Critical Area of Focus or a mathematical topic of related standards. Think about what your typical instruction for this critical area of focus looks like. Determine whether changes are needed to grow all students mathematically.

- What was present in past instruction that helped students perform well?
  - Using the Gap Analysis, Critical Area of Focus, Learning Progressions and Model Curriculum documents, what previous learning is likely absent or weak?
  - What experiences would support bridging the gap(s)?
  - How could you strengthen the Standards for Mathematical Practice to help support or enhance learning?
  - Specifically, what tasks would be used?

- What does typical instruction include?
  - Models/representations? What models or representations need introduction?
  - One-step, two-step or multi-step problems? Is more experience needed? What?
  - Routine and non-routine problems? Is more experience needed? What?
  - Mathematical and real-world contexts? Is more experience needed? What rich tasks could incorporate multiple standards?

- Did the mathematical contexts use numbers and operations appropriate for the grade level?
  - How could those numbers be modified to highlight the mathematical understanding needed and increase access for all students?

- Were the real-world contexts familiar or unfamiliar to the students?
  - How do you know?
  - What is needed now?

- Did the instruction allow opportunities for student reasoning and communication?
  - Productive struggle?
  - Student analysis of individual work, thinking and reasoning of others?
  - Descriptions, explanations and justifications?
  - Error analysis and reasonableness of answers?
  - What changes are needed to strengthen the Standards for Mathematical Practice?

- From this analysis, what overall changes are needed in instruction?
  - What instructional strategies should be maintained?
  - What instructional strategies require modification?
  - What needs to happen next to increase learning for all students?
    - Resources
    - Instructional strategies
    - Professional development
      - Do I need to seek out professional learning opportunities? What opportunities do I have for growing my own learning? What supports do I have to make these changes?
Grade 7
Reporting Category:
Ratio and Proportions

CRITICAL AREA OF FOCUS #1
Developing understanding of and applying proportional relationships
Question ____

At a grocery store, a bag of 12 red apples costs $10.80 and a bag of 6 green apples costs $6.90.

Which statement is true about the cost of the apples?

A. The cost per green apple is less than the cost per red apple because 6 is less than 12.

B. The cost per green apple is less than the cost per red apple because $6 ÷ 6.90 is less than $12 ÷ 10.80.

C. The cost per green apple is greater than the cost per red apple because $6.90 ÷ 6 is greater than $10.80 ÷ 12.

D. The cost per green apple is greater than the cost per red apple because $6.90 ÷ 10.80 is greater than $6 ÷ 12.

Question ____

A faucet drips $\frac{2}{3}$ gallon of water in 10 hours.

Which rate is the unit rate of water dripped per day?

A. $\frac{1}{15}$ gallon per day

B. $\frac{5}{18}$ gallon per day

C. $1 \frac{3}{5}$ gallons per day

D. $6 \frac{2}{3}$ gallons per day
Question ____

A baker mixes $8\frac{3}{4}$ cups of white flour with $2\frac{1}{2}$ cups of rye flour for a bread recipe.

How many cups of white flour does the baker mix for every 1 cup of rye flour?

Question ____

At Olivia's Burger House, each burger costs the same price. John buys 5 burgers for $7.50.

Place the point at the location on the graph that represents the unit price for 1 burger.
Question ____

Michael knows that 2 cans of paint is the exact amount he needs to paint a 10-foot by 12-foot wall.

Use the Add Arrow tool to show the relationship between the total square feet of the walls and the number of paint cans necessary to paint them.

Question ____

A scientist records the number of deer observed in three areas of a forest. The table shows her observations.

<table>
<thead>
<tr>
<th>Area</th>
<th>Square Miles</th>
<th>Number of Deer</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>18</td>
<td>162</td>
</tr>
<tr>
<td>B</td>
<td>17</td>
<td>153</td>
</tr>
<tr>
<td>C</td>
<td>26</td>
<td>234</td>
</tr>
</tbody>
</table>

How many deer per square mile did the scientist observe in the forest?

Question ____

A grocery store sells an 8-ounce bottle of juice for $1.76.

What is the cost of the juice per ounce?

$
Which table shows a proportional relationship?

(A) \[
\begin{array}{|c|c|}
\hline
x & y \\
\hline
2 & 4 \\
3 & 9 \\
4 & 16 \\
5 & 25 \\
\hline
\end{array}
\]

(C) \[
\begin{array}{|c|c|}
\hline
x & y \\
\hline
2 & 1 \\
3 & 2 \\
4 & 3 \\
5 & 4 \\
\hline
\end{array}
\]

(B) \[
\begin{array}{|c|c|}
\hline
x & y \\
\hline
2 & 4 \\
3 & 6 \\
4 & 8 \\
5 & 10 \\
\hline
\end{array}
\]

(D) \[
\begin{array}{|c|c|}
\hline
x & y \\
\hline
2 & 8 \\
3 & 8 \\
4 & 8 \\
5 & 8 \\
\hline
\end{array}
\]

Question ____

Kaya’s family spends $105 to rent a boat for 7 days. The total cost, \( c \), of the boat rental is proportional to the number of days, \( d \), the family rents the boat.

A. How much does it cost, in dollars, to rent the boat for one day?

B. Create an equation using \( c \) and \( d \) to represent the proportional relationship.

A. \( \$ \) 

B. 

Question ____

An energy company graphs the average number of rotations that a windmill makes each minute for 4 minutes.

Which statement describes what the point (1, 12) means in terms of rotations and minutes?

A. 1 rotation occurs every 12 minutes.
B. \(\frac{1}{12}\) of a rotation occurs every minute.
C. The windmill rotates 12 times in 1 minute.
D. The windmill rotates 12 times in 12 minutes.

Question ____

An online music store sells songs on its website. Each song is the same price. The cost to purchase 8 songs is $10.

A. Create an equation to represent the relationship between the total cost, \(c\), and number of songs, \(s\), purchased.

B. At this rate, how many songs can be purchased for $25?

A. 

B.
Question ____

Pete and Teagan each put the same amount of money in a new bank account. Teagan’s account earns 2.75% simple interest, and she earned $2.20 in interest after one year. Pete’s account earns 5% simple interest.

How much interest did Pete earn in his account after one year?

$ \hfill \\

Question ____

An experiment for a chemical reaction involves mixing 1 teaspoon of yeast with $\frac{1}{2}$ cup of hydrogen peroxide.

Delray wants to do the same experiment with larger amounts of the two ingredients. He uses $1 \frac{1}{2}$ cups of hydrogen peroxide and needs to keep the same ratio of yeast to hydrogen peroxide. Note that there are 48 teaspoons in 1 cup.

How much yeast, in cups, should Delray mix with this amount of hydrogen peroxide?

\hfill \text{\textit{cup(s)}}
Grade 7
Reporting Category

The Number System

CRITICAL AREA OF FOCUS #2
Developing understanding of operations with rational numbers and working with expressions and linear equations
Select the three expressions that are equivalent to \(-2(4 - 3x) + (5x - 2)\).

- [ ] \(2x - 10\)
- [ ] \(11x - 10\)
- [ ] \(-8 + 11x - 2\)
- [ ] \(-8 - 11x - 2\)
- [ ] \(-8 + 6x + 5x - 2\)
- [ ] \(-8 - 3x + 5x - 2\)

Two identical square tables are combined to create a rectangular table, as shown.

A third identical square table will be added to create a longer rectangular table.

Which expression reveals the number of chairs along each side of the longer rectangular table?

- [a] \(2 \cdot 4 + 2 \cdot 2\)
- [b] \(2 \cdot 6 + 2 \cdot 2\)
- [c] \(3 \cdot 2 + 3 \cdot 2\)
- [e] \(4 \cdot 2 + 4 \cdot 2\)
Question ____

The distance of one lap around a school track is \( \frac{1}{4} \) mile. Sherrie walks 5 laps around the track.

How many more laps must Sherrie walk to reach a total distance of 3.5 miles?

\[ \text{laps} \]

Question ____

Chris wrote an equation and the first step of his solution process, as shown.

\[
16 = 12 - 6x \\
4 = -6x
\]

Which math operation did Chris apply in his first step?

A. He divided 16 by 4.

B. He added 12 to each side of the equation.

C. He divided each side of the equation by 4.

D. He subtracted 12 from each side of the equation.

Question ____

Michael has $317.89 in his bank account. He uses the money in his account to purchase new clothes for $48.72, lunch for $10.13, and a bike tire for $32.46.

How much money does Michael have left in his bank account after making the purchases?

\[ \$ \]
Question ____

Keith purchases a cell phone plan, which includes a cell phone and cell phone service. He makes a deposit of $100 for the cell phone and then pays $45 per month for the cell phone service.

A. Create an equation to model the total amount of money, y, in dollars, Keith spends on the cell phone and plan after x months.

B. How much money does Keith spend per year for cell phone service?

A. \( y = \) __________

B. $ __________

Question ____

The perimeter of a regular 6-sided figure is 30 units, and the length of each side is \( x + 1 \) units.

What is the value of \( x \)?

__________

Question ____

Mary goes to the bakery with $35. She purchases 2 loaves of bread for $3 each and a cake for $15. She plans to spend the remainder of her money on cookies that cost $1.25 each.

What is the greatest number of cookies that Mary can buy?

__________ cookies
A number line is shown.
Select all of the points that are 7 units from point P on the number line.

A teacher selects two different numbers, \( p \) and \( q \), and states that \( p + q = 0 \).

Which statement could be true about these two numbers?

A. Both numbers are positive.
B. Both numbers are negative.
C. One number is zero and the other is positive.
D. One number is positive and the other is negative.
Question ____

Gerard adds weight to the end of a hanging spring as shown.

The spring stretches to a length of \( p \) centimeters. Gerard removes some weight and the spring moves up by \( q \) centimeters.

Which expression represents the length of the spring after Gerard removes some weight?

A. \( p - (-q) \)
B. \( (-p) - q \)
C. \( p + (-q) \)
D. \( -q + (-p) \)

Question ____

The temperature yesterday in Perrysburg, Ohio, was \(-6^\circ F\).

The temperature today in Perrysburg is \(6^\circ F\) warmer.

What is the temperature today?

A. \(-12^\circ F\)
B. \(12^\circ F\)
C. \(6^\circ F\)
D. \(0^\circ F\)
Three numbers are plotted on a number line, as shown.

\[ p \quad m \quad 0 \quad n \]

This item has three parts.

**Part A.** Which expression is equivalent to \( m - n \)?

\[ \begin{align*}
\text{(A)} & \quad -m + n \\
\text{(B)} & \quad -m + (-n) \\
\text{(C)} & \quad m + n \\
\text{(D)} & \quad m + (-n)
\end{align*} \]

**Part B.** For each expression, select a box to identify whether the value of the expression is to the left or to the right of \( m \) on the number line.

<table>
<thead>
<tr>
<th>Expression</th>
<th>To the left of ( m )</th>
<th>To the right of ( m )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( m + n )</td>
<td>( \square )</td>
<td>( \square )</td>
</tr>
<tr>
<td>( m - n )</td>
<td>( \square )</td>
<td>( \square )</td>
</tr>
<tr>
<td>( m + p )</td>
<td>( \square )</td>
<td>( \square )</td>
</tr>
<tr>
<td>( m - p )</td>
<td>( \square )</td>
<td>( \square )</td>
</tr>
</tbody>
</table>

**Part C.** Create an expression that represents the distance on the number line between \( m \) and \( p \).
Question ____

Which number is equivalent to \( \frac{8}{11} \)?

- A. 0.72
- B. 0.72
- C. 0.7
- D. 1.375

Question ____

An expression is shown.

\[ 2(-5.25) \]

What is the value of the expression?

Question ____

What is the value of \( \frac{2}{3}( -9 + 3) \)?
Grade 7
Reporting Category:

Geometry

CRITICAL AREA OF FOCUS #3
Solving problems involving scale drawings and informal geometric constructions, angles, and working with two- and three-dimensional shapes to solve problems involving area, surface area, and volume
**Question 1**

Micah has a garden. He constructs a scale model of the garden using the scale 1 inch : 2 feet. The garden has a length of 6 feet.

What is the length of the garden in Micah’s model?

- 3 inches
- 4 inches
- 6 inches
- 12 inches

**Question 2**

Magdalena creates the scale drawing shown of a rectangular field.

![Scale Drawing]

What is the area, in square meters (m²), of the actual field?

\[ m^2 \]
The figure on the left represents a scale drawing of the figure on the right.

What is the scale?

1 inch : __________ yards

An architect makes a scale drawing of a building. She uses the scale shown.

1 centimeter = 3 meters

The length of the building in the drawing is 11 centimeters.

What is the actual length, in meters, of the building?

_________ meters

A triangle has two equal side lengths and a third side that is shorter than the other two lengths.

Use the Connect Line tool to create a possible triangle.
Select all of the solids that could be sliced horizontally or vertically to create a triangular cross section.

A two-dimensional cross section is created by slicing a pyramid parallel to its base.

Which statement best describes the cross section?

- A. the same shape as the base but a larger area
- B. the same shape as the base but a smaller area
- C. a different shape than the base and a larger area
- D. a different shape than the base and a smaller area
Question ____

A right square pyramid is sliced through its apex and perpendicular to its base. What is the shape of the cross section that is the result of this action?

- A a square
- B an isosceles triangle
- C an isosceles trapezoid
- D a non-isosceles trapezoid

Question ____

Which expression represents the area of a circle with a radius of 7 units?

- A $7 \cdot 2 \cdot \pi$
- B $7 \cdot 7 \cdot \pi$
- C $7 \cdot \pi \cdot \pi$
- D $3.5 \cdot 3.5 \cdot \pi$

Question ____

A container in the shape of a rectangular prism holds 651.168 cubic inches when completely filled with water. The container has a length of 12.6 inches and a width of 15.2 inches.

What is the height, in inches, of the container?

inches
Grade 7
Reporting Category:

Statistics and Probability

CRITICAL AREA OF FOCUS #4
Drawing inferences about populations based on samples Students build on their previous work with statistical problem solving
Question ____

Chris wants to determine the most popular sport of the students at his school.

Which sample should he survey?

A  a group of his friends
B  a group of students on the soccer team
C  a group of randomly selected students from each grade at his school
D  a group of randomly selected students from each sports team at his school

Question ____

There are 300 students in 7th grade. Paul takes a random sample to find out which fall sport the students in 7th grade prefer.

Which group of students represents the most valid sample?

A  10 of Paul’s closest friends
B  10 students from each grade
C  10 students from each 7th grade homeroom
D  10 students on the 7th grade basketball team
Jerry grows two different types of oranges. He wants to know which type of orange weighs more. He takes a random sample of oranges from each type of tree and creates the dot plots shown with their weights, in ounces.

Based on these data, which statement is true?

A. It is certain that a Type B orange weighs more than a Type A orange.
B. There is evidence that a Type B orange typically weighs more than a Type A orange.
C. There is no evidence that a Type B orange weighs more than a Type A orange.
D. The mean absolute deviation of the sample is less for a Type A orange than for a Type B orange.
The leaders of two youth sports teams randomly select five members of each team and record their ages, as shown.

- Team A: 16, 13, 12, 16, 13
- Team B: 10, 13, 16, 16, 10

Which statement appropriately compares the ages of the team members?

A. Members of Team A and members of Team B are likely the same average (mean) age.
B. Members of Team A are likely younger, and they have less variability in their ages.
C. Members of Team A are likely older, and they have more variability in their ages.
D. Members of Team A are likely older, and they have less variability in their ages.

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Event Q is more likely to occur than event T. The probability of event T is $\frac{1}{2}$.

What is a possible probability of event Q?

$$P(Q) =$$
Question ____

Mr. Prescott asks all the students in his class whether they play sports. A randomly selected student in his class is more likely to play sports than not to play sports.

A. What is a possible probability that a randomly selected student from Mr. Prescott’s class plays sports?

B. Based on your probability in part A, what is a possible probability that a randomly selected student from Mr. Prescott’s class does not play sports?

A. 

B. 

Question ____

Joe designs a weighted number generator that produces the integers 0 to 4. He then runs the generator 500 times. The results are shown in the table.

<table>
<thead>
<tr>
<th>Integer</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>49</td>
</tr>
<tr>
<td>1</td>
<td>74</td>
</tr>
<tr>
<td>2</td>
<td>104</td>
</tr>
<tr>
<td>3</td>
<td>121</td>
</tr>
<tr>
<td>4</td>
<td>152</td>
</tr>
</tbody>
</table>

If Joe runs the generator a total of 4,000 times, which is closest to the expected number of times the integer 4 is produced?

A. 152
B. 812
C. 1,018
D. 1,223
Question ____

A gumball machine contains equal numbers of red, yellow, green, and blue gumballs. It randomly gives out one gumball for each pull at the machine.

What is the probability of getting a red or green gumball from one pull at the machine?

___

Question ____

A factory produces 80,000 candies each day. They produce equal quantities of four flavors: cherry, lemon, orange, and strawberry. The candies are mixed together during packaging.

What is the probability that a randomly selected candy is orange?

___

Question ____

Zayne has a bag filled with coins. The bag contains 7 quarters, 8 dimes, 3 nickels, and 9 pennies. He randomly chooses a coin from the bag.

What is the probability that Zayne chooses a quarter or a nickel?

___

Question ____

The letter tiles shown are placed in a bowl. Matt selects one tile from the bowl.

H J K M O P S U Z Y

What is the probability that Matt will select one of the letters in the word "JUMP"?

___
Question ____

A bag contains 25 cookies. There are 15 chocolate chip cookies, 7 peanut butter cookies, and the rest are oatmeal raisin cookies.

What is the probability of randomly choosing a chocolate chip or peanut butter cookie from the bag?

Question ____

Kayla rolls two fair number cubes each numbered 1 through 6. She needs to roll a sum of 9 or more to win a game. She rolls the number cubes one at a time. She rolls a 5 with the first number cube.

What is the probability that Kayla will win the game?

Question ____

Arianne drives by a stop light near her home once every morning. The stop light has red, yellow, and green lights. She wants to know the probability of the light being red on two mornings.

Which list represents the sample space for two mornings at the stop light?

A red, yellow, green
B red/red, yellow/yellow, green/green
C red/yellow, red/green, yellow/green, yellow/red, green/yellow, green/red
D red/red, red/yellow, red/green, yellow/red, yellow/yellow, yellow/green, green/red, green/yellow, green/green