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 8
- 2018 Item Release Scoring Guide Grade 8
- 2019 Item Release Scoring Guide Grade 8
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 8
Reporting Category:
Expressions and Equations

CRITICAL AREA OF FOCUS #1
Formulating and reasoning about expressions and equations, including modeling an association in bivariate data with a linear equation, and solving linear equations and systems of linear equations
Question ____

Marisol, Timothy, and Zorian each have a machine that purifies water. The two tables show how much purified water Marisol’s and Timothy’s machines have produced at certain times after pouring water into the machine.

<table>
<thead>
<tr>
<th>Time (hours)</th>
<th>Marisol’s Machine</th>
<th>Amount of Water (ounces)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>18</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>30</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>48</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time (hours)</th>
<th>Timothy’s Machine</th>
<th>Amount of Water (ounces)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td></td>
<td>36</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>54</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>81</td>
</tr>
</tbody>
</table>

Zorian’s machine produces purified water at a constant rate that is faster than the rate for Marisol’s machine and slower than the rate for Timothy’s machine.

Which equation could represent the amount of purified water, \( y \), in ounces, that Zorian’s system produces after \( x \) hours?

A. \( y = 15x \)
B. \( y = 9x \)
C. \( y = 8x \)
D. \( y = 6x \)

Question ____

Point P is located at \((-1, 5)\) on the coordinate plane, and point Q is located at \((3, -3)\).

Which point lies on line PQ?

A. \((5, -13)\)
B. \((2, 1)\)
C. \((1, 1)\)
D. \((3, 13)\)
**Question 1**

Point M is located at (10, 10) and point N is located at (15, 25).

Which point lies on line MN?

A. (0, 0)
B. (11, 13)
C. (13, 13)
D. (20, 20)

**Question 2**

What is the solution to the equation $3x + 2 + 5x = 16$?

$x =$

**Question 3**

Which equation has exactly one solution?

A. $7x = 7$
B. $7x = 7x$
C. $x + 1 = x + 1$
D. $x + 1 = x + 2$
Question ____

An equation is shown.

6x - 3 = 3x + 12

What is the solution to the equation?

x = __________

Question ____

The graph of a system of two linear equations is shown.

Which point represents the solution to the system?

A) P
B) Q
C) R
D) S
A system of equations is shown.

\[
\begin{align*}
\{ & y = 2x - 7 \\
& y = -x + 5
\end{align*}
\]

What is the solution to the system of equations?

( , )

Which graph shows a line of best fit for the data?
The number of inches of rain, $y$, after $x$ minutes of rainfall during a storm can be modeled by the equation shown.

$y = 0.003x$

How many inches of rain falls in 2 minutes?

\[
\text{inches}
\]
Grade 8
Reporting Category:

Functions

CRITICAL AREA OF FOCUS #2
Grasping the concept of a function and using functions to describe quantitative relationships
Question

This item has two parts.

A group of words and a rule are given.

**Words**

Six, Seven, Eight, Nine, Ten

**Rule**

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>The number of the letters in the word</td>
<td>The number the word represents</td>
</tr>
</tbody>
</table>

**Part A.** Complete the table using the rule given.

<table>
<thead>
<tr>
<th>Word</th>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Six</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seven</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eight</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ten</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Part B.** Complete the statement.

The table of values _a function because_ _

---

Question

Some points of a function are plotted as shown.

Select all of the points that could also be part of this function.

- (1, 3)
- (4, 4)
- (6, 0)
- (7, 2)
- (9, 7)
Question

Lyla and Dwayne each sell tickets at a concert. They start selling the tickets at the same time.

- Lyla starts with 500 tickets and sells them at an average rate of 5 tickets per minute.
- The number of tickets, \( t \), Dwayne has left after \( m \) minutes is represented in the table shown.

\[
\begin{array}{c|c}
 m & t \\
 0 & 600 \\
 4 & 580 \\
 8 & 560 \\
 12 & 540 \\
\end{array}
\]

Which statement is true?

A. Dwayne’s average rate of tickets sold per minute is higher than Lyla’s average rate.
B. Lyla’s average rate of tickets sold per minute is higher than Dwayne’s average rate.
C. Dwayne begins with more tickets than Lyla.
D. Lyla begins with more tickets than Dwayne.

Question

Pumps are used to empty water from two tanks, tank P and tank Q.

Tank P begins with 65 gallons of water and empties at a rate of 6.5 gallons per minute. The amount of water in tank Q is represented by the equation \( y = 63.5 - 5.25x \), where \( x \) is the number of minutes the pump has been emptying the tank.

Which statement is true?

A. Tank P empties at a faster rate than tank Q and had a lesser starting amount than tank Q.
B. Tank P empties at a faster rate than tank Q and had a greater starting amount than tank Q.
C. Tank P empties at a slower rate than tank Q and had a lesser starting amount than tank Q.
D. Tank P empties at a slower rate than tank Q and had a greater starting amount than tank Q.
Two plumbers charge an initial fee and an hourly rate.

The equation $y = 100 + 30x$ models plumber A's fee, where $y$ is the total charge, in dollars, and $x$ is the number of hours worked.

The table shown represents plumber B's total charge for different numbers of hours.

<table>
<thead>
<tr>
<th>Hours</th>
<th>Total Charges ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>105</td>
</tr>
<tr>
<td>2</td>
<td>160</td>
</tr>
<tr>
<td>3</td>
<td>215</td>
</tr>
</tbody>
</table>

Which statement about the plumbers' charges is true?

A. The two plumbers have equal hourly rates.
B. Plumber A has a greater initial fee.
C. Plumber A has a greater hourly rate.
D. The two plumbers have equal initial fees.

Which graph represents $y$ as a linear function of $x$?
Question ____

Which graph represents a linear function?

A)  

\[
\begin{array}{|c|c|}
\hline
x & y \\
\hline
-6 & - \quad \quad -4 \\
-4 & - \quad \quad -2 \\
0 & \quad \quad \quad \quad 0 \\
2 & \quad \quad \quad \quad 2 \\
4 & \quad \quad \quad \quad 4 \\
6 & \quad \quad \quad \quad 6 \\
\hline
\end{array}
\]

B)  

\[
\begin{array}{|c|c|}
\hline
x & y \\
\hline
-6 & - \quad \quad -4 \\
-4 & - \quad \quad -2 \\
0 & \quad \quad \quad \quad 0 \\
2 & \quad \quad \quad \quad 2 \\
4 & \quad \quad \quad \quad 4 \\
6 & \quad \quad \quad \quad 6 \\
\hline
\end{array}
\]

C)  

\[
\begin{array}{|c|c|}
\hline
x & y \\
\hline
-6 & - \quad \quad -4 \\
-4 & - \quad \quad -2 \\
0 & \quad \quad \quad \quad 0 \\
2 & \quad \quad \quad \quad 2 \\
4 & \quad \quad \quad \quad 4 \\
6 & \quad \quad \quad \quad 6 \\
\hline
\end{array}
\]

D)  

\[
\begin{array}{|c|c|}
\hline
x & y \\
\hline
-6 & - \quad \quad -4 \\
-4 & - \quad \quad -2 \\
0 & \quad \quad \quad \quad 0 \\
2 & \quad \quad \quad \quad 2 \\
4 & \quad \quad \quad \quad 4 \\
6 & \quad \quad \quad \quad 6 \\
\hline
\end{array}
\]

Question ____

Complete the table to create a linear function.

<table>
<thead>
<tr>
<th>$x$</th>
<th>$y$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>
Question ____

The graph of a linear function passes through the two given points on the coordinate plane.

(3, 15)
(6, 21)

What is the rate of change of the function?


Question ____

The graph of a function is shown.

Which statement correctly describes the graph?

A. The slope is zero.
B. The slope is undefined.
C. The function is increasing.
D. The function is decreasing.
Diedra has a new coin bank. For the first five days, she deposits the same amount of money into the coin bank. After that, she does not deposit any more money into the bank.

Which graph could represent the amount of money in Diedra's bank?

Which graph shows a function that is increasing at a constant rate?
Mario rides his scooter to his friend’s house. His trip is represented in the graph shown.

Which statement describes Mario’s ride?

A. Mario first stayed in one place and then rode at a constant rate.
B. Mario first rode at a constant speed and then he stopped for some time.
C. Mario first rode at one constant speed and then at a faster constant speed.
D. Mario first rode at one constant speed and then at a slower constant speed.
Grade 8
Reporting Category:

Geometry

CRITICAL AREA OF FOCUS #3
Analyzing two- and three-dimensional space and figures using distance, angle, similarity, and congruence, and understanding and applying the Pythagorean Theorem
A series of translations, rotations and reflections is applied to Triangle 1 to create Triangle 2, as shown.

Triangle 1

7 ft
57°
8 ft
42°

Triangle 2

8 ft
x
7 ft

What is the measure, in degrees, of the angle x?

[Blank] degrees

Two quadrilaterals are shown, where quadrilateral EFGH is created by reflecting quadrilateral ABCD across a line and then rotating it.

What is the value of x, in units?

[Blank] units
Question ____

An architect designs floor plans for two houses. The floor plans for the houses are shown.

House B is a reflection of House A.

What is the value of $x$?

feet

Question ____

Pentagon A is rotated 180° about its center and then translated to create pentagon B.

What is the value of $x$?

Question ____

A transformation is to be performed on a figure.

Which transformation will not produce a congruent figure?

- reflection across the x-axis
- translation 2 units to the right
- rotation of 180 degrees about the origin
- dilation with a scale factor of 2 centered at the origin
Question ____

A figure is shown.

The figure is reflected across line \( l \).

Which figure is the result of this transformation?

- (A)\[\begin{array}{c}
\begin{array}{c}
\text{A} \\
\text{B}
\end{array}
\end{array}\]
- (B)\[\begin{array}{c}
\begin{array}{c}
\text{A} \\
\text{B}
\end{array}
\end{array}\]
- (C)\[\begin{array}{c}
\begin{array}{c}
\text{A} \\
\text{B}
\end{array}
\end{array}\]
- (D)\[\begin{array}{c}
\begin{array}{c}
\text{A} \\
\text{B}
\end{array}
\end{array}\]

Question ____

Quadrilateral \( ABCD \) is shown.

\[\begin{array}{c}
\begin{array}{c}
\text{A} \\
\text{B} \\
\text{C} \\
\text{D}
\end{array}
\end{array}\]

\( \begin{array}{c}
\begin{array}{c}
6 \\
5 \\
8 \\
3
\end{array}
\end{array}\)

\( \text{ABCD} \) is translated to create quadrilateral \( \text{EFGH} \).

What is the length, in units, of side \( \text{EH} \)?

\[\square \text{units}\]
Two triangles, $\triangle JKL$ and $\triangle MNO$, are shown.

Which transformation can be applied to $\triangle JKL$ to create $\triangle MNO$?

(A) a clockwise rotation of $180^\circ$ about the origin
(B) a clockwise rotation of $90^\circ$ about the origin
(C) a reflection across the line $y = x$
(D) a reflection across the $x$-axis
Two triangles are shown.

What transformations can be used to show that \( \triangle LMN \) is similar to \( \triangle PQR \)?

A) dilation, reflection  
B) reflection, translation  
C) rotation, dilation  
D) translation, rotation
Question ____

A horizontal line $m$ is shown with two similar triangles, ABC and DEF.

How can triangle ABC be transformed to result in triangle DEF?

- a reflection across a vertical line
- a 90-degree rotation about point C
- a dilation, then a translation to the right
- a dilation, then a reflection across a vertical line

Question ____

Line $c$ intersects parallel lines $m$ and $n$ as shown.

What is the value of $x$, in degrees?

degrees
Question ____

Parallel lines $p$ and $q$ are intersected by transversal $r$, as shown.

What is the value of $x$?

Question ____

A cone has a slant height of 25 inches and a radius of 7 inches as shown.

What is the height, $h$, in inches, of the cone?

$$h = \quad \text{inches}$$

Question ____

Chandni compares two cylinders.
- Both cylinders have an identical base.
- The first cylinder has a height of 4 inches and a volume of 120 cubic inches.
- The second cylinder has a height of 7 inches.

What is the volume, in cubic inches, of the second cylinder?

$$\quad \text{cubic inches}$$
Question ____

Point A is shown on the coordinate grid.

The distance between point A and point B is 5 units. The x-coordinate of point B is -2.

What is one possible y-coordinate of point B?

Question ____

Nadya has a cylindrical container that stores sugar. The radius of the container’s base is 5 centimeters, and the height of the container is 18 centimeters.

What is the volume of Nadya’s container, rounded to the nearest cubic centimeter?

\[ \text{cubic centimeters} \]
Grade 8
Reporting Category:
The Number System

CRITICAL AREA OF FOCUS #4
Working with irrational numbers, integer exponents, and scientific notation
Question ____

Which expression is equivalent to $(5^2)^4 \cdot 5^5$?

- A. $5^{11}$
- B. $5^{13}$
- C. $5^{30}$
- D. $5^{40}$

Question ____

An equation is given.

$x^3 = 27$

What is the value of $x$?

$x = \phantom{0}$

Question ____

An expression is shown.

$\sqrt[3]{27} + 10$

What is the value of the expression?
Question ____

Which expression is equivalent to 0.00007?

A. $7 \times 10^{-5}$
B. $7 \times 10^{-4}$
C. $7 \times 10^4$
D. $7 \times 10^5$

Question ____

A scientist estimates that there are $2.2 \times 10^7$ walleye in Lake Erie. The total volume of Lake Erie is $4.83 \times 10^{15}$ cubic meters. A pool with a volume of 200,000 cubic meters is built to model the lake.

How many walleye should be put into the pool to model the conditions in the lake?

Question ____

An ant weighs $8.8 \times 10^{-6}$ pound and can carry objects up to 5,000 times greater than its own body weight.

What is the greatest weight, in pounds, the ant can carry? Express your answer in standard form.

$\text{pound}$
Question ____

An expression is given that has a value between 4.4 and 4.5, and where $x$ represents an integer.

$\sqrt{x} + \sqrt{x}$

What is the value of $x$?

$x =$

Question ____

Approximate the value of $\sqrt{23}$ and place it on the number line.

Question ____

The value of $\sqrt{k}$ lies between 2.2 and 2.3.

Select all possible values of $k$.

- 1.49
- 4.8
- 5
- 5.04
- 5.3
- 6