Kentucky Summative Assessments


# Grade 10 Mathematics
# Released Items
## 2024

**1**

MA1020100_1,4

A cube has sides of length $\sqrt[3]{7}$ inches. Which expressions represent the volume, in cubic inches, of this cube?

Select **two** correct answers.

**A** $(7)^{\frac{3}{3}}$

**B** $(7^3)^{\frac{1}{2}}$

**C** $\left(7^{\frac{1}{3}}\right)^{\frac{1}{3}}$

**D** $\left(7^{\frac{1}{3}}\right)^{3}$

**E** $\left(7^{\frac{1}{2}}\right)^{3}$

# Released Item Performance

## Kentucky Summative Assessments

**Spring 2024**
**Grade 10**
**Mathematics**

**Item:** MA1020100
**Book Question Number:** 1

**Standard:** KY.HS.N.1

**Item Type:** MS
**Key:** A,D

| Student Group | Number of Students | Percent Correct | Average Item Score | Item Breakout Statistics - Score Percentages | | |
|---|---|---|---|---|---|---|
| | | | | Score 0 (%) | Score 1 (%) | Score 2 (%) |
| *All Students* | **23,067** | 46.8% | 0.94 | 28% | 50% | 22% |
| *Gender* | | | | | | |
| Female | **11,008** | 46.3% | 0.93 | 29% | 49% | 22% |
| Male | **12,058** | 47.3% | 0.95 | 27% | 51% | 22% |
| *Ethnicity* | | | | | | |
| African American | **2,571** | 45.0% | 0.90 | 28% | 53% | 18% |
| American Indian or Alaska Native | **30** | 50.0% | 1.00 | 17% | 67% | 17% |
| Asian | **416** | 57.1% | 1.14 | 22% | 42% | 36% |
| Hispanic or Latino | **2,323** | 44.9% | 0.90 | 28% | 54% | 18% |
| Native Hawaiian or Pacific Islander | **52** | 36.5% | 0.73 | 38% | 50% | 12% |
| White (non-Hispanic) | **16,660** | 47.2% | 0.94 | 28% | 49% | 23% |
| Two or more races | **1,013** | 45.6% | 0.91 | 29% | 51% | 20% |
| | | | | | | |
| Migrant | **133** | 45.1% | 0.90 | 26% | 57% | 17% |
| | | | | | | |
| English Learner | **1,239** | 44.4% | 0.89 | 27% | 57% | 16% |
| | | | | | | |
| Economically Disadvantaged | **13,650** | 45.2% | 0.90 | 28% | 53% | 19% |
| | | | | | | |
| Students with Disabilities | **3,650** | 44.6% | 0.89 | 27% | 58% | 16% |

**2** MA1020046

A customer can rent a party room at a restaurant. The cost to rent a room is $150 for up to 10 guests and $12 for each additional guest after the tenth guest.

- Write an equation that can be used to determine the total cost of renting a room, $C(x)$, if $x$ guests attend.
- What is the total charge, in dollars, to rent a party room for 15 guests?

Enter **only** your equation and your answer in the space provided.

$C(x) =$ ☐

Total charge for 15 guests: $☐

# Released Item Performance

## Kentucky Summative Assessments

**Spring 2024**
**Grade 10**
**Mathematics**

**Item:** MA1020046
**Book Question Number:** 2

**Standard:** KY.HS.F.12

**Item Type:** SA
**Key:** Rubric

| Student Group | Number of Students | Percent Correct | Average Item Score | Item Breakout Statistics - Score Percentages | | |
|---|---|---|---|---|---|---|
| | | | | Score 0 (%) | Score 1 (%) | Score 2 (%) |
| *All Students* | **35,843** | 33.4% | 0.67 | 37% | 58% | 4% |
| *Gender* | | | | | | |
| Female | **17,991** | 32.6% | 0.65 | 39% | 58% | 4% |
| Male | **17,852** | 34.3% | 0.69 | 36% | 59% | 5% |
| *Ethnicity* | | | | | | |
| African American | **3,830** | 22.5% | 0.45 | 56% | 43% | 1% |
| American Indian or Alaska Native | **44** | 30.7% | 0.61 | 39% | 61% | 0% |
| Asian | **677** | 42.7% | 0.85 | 29% | 57% | 14% |
| Hispanic or Latino | **3,371** | 27.1% | 0.54 | 48% | 50% | 2% |
| Native Hawaiian or Pacific Islander | **63** | 33.3% | 0.67 | 37% | 60% | 3% |
| White (non-Hispanic) | **26,236** | 35.7% | 0.71 | 33% | 62% | 5% |
| Two or more races | **1,621** | 31.8% | 0.64 | 39% | 58% | 3% |
| | | | | | | |
| Migrant | **134** | 17.9% | 0.36 | 64% | 36% | 0% |
| | | | | | | |
| English Learner | **1,471** | 12.6% | 0.25 | 75% | 24% | 0% |
| | | | | | | |
| Economically Disadvantaged | **20,330** | 29.0% | 0.58 | 44% | 54% | 2% |
| | | | | | | |
| Students with Disabilities | **1,979** | 19.4% | 0.39 | 63% | 36% | 2% |



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3

MA1019056_:

## Overtime Pay

Katie has a job at a supermarket.

- She earns an hourly rate of $8 for each hour that she works in a 40-hour workweek.
- For each overtime hour (that is each hour that she works over 40 hours in a week), she earns an hourly rate that is 1.5 times her regular hourly rate.

### Part A

Katie wants to earn a total of at least $1,500 working at her job during the next 4 weeks. She plans to work at least 40 hours each week.

- What is the amount, in dollars, that Katie is paid for each overtime hour?
- Write an inequality that can be used to determine the number of overtime hours ($x$) Katie would have to work in the next 4 weeks to earn a total of at least $1,500.

Enter your answer and your inequality in the space provided.

### Part B

Katie is only allowed to work in whole hour increments. Determine the number of overtime hours ($x$) Katie would have to work in the next 4 weeks to earn a total of at least $1,500. Show your work.

Enter your answer and your work in the space provided.

# Released Item Performance

## Kentucky Summative Assessments

**Spring 2024**
**Grade 10**
**Mathematics**

**Item:** MA1019056*
**Book Question Number:** 3

**Standard:** KY.HS.A.12

**Item Type:** ER
**Key:** Rubric

| Student Group | Number of Students | Percent Correct | Average Item Score | Item Breakout Statistics - Score Percentages | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Score 0 (%) | Score 1(%) | Score 2 (%) | Score 3 (%) | Score 4 (%) |
| *All Students* | **43,698** | 19.6% | 0.79 | 48% | 32% | 15% | 2% | 2% |
| *Gender* | | | | | | | | |
| Female | **21,910** | 19.7% | 0.79 | 49% | 32% | 14% | 3% | 3% |
| Male | **21,787** | 19.6% | 0.78 | 48% | 32% | 15% | 2% | 2% |
| *Ethnicity* | | | | | | | | |
| African American | **4,355** | 9.8% | 0.39 | 70% | 23% | 6% | 1% | 1% |
| American Indian or Alaska Native | **54** | 16.7% | 0.67 | 56% | 24% | 19% | 2% | 0% |
| Asian | **865** | 31.8% | 1.27 | 32% | 33% | 20% | 7% | 9% |
| Hispanic or Latino | **4,159** | 13.6% | 0.54 | 61% | 26% | 10% | 1% | 1% |
| Native Hawaiian or Pacific Islander | **88** | 16.5% | 0.66 | 59% | 24% | 11% | 3% | 2% |
| White (non-Hispanic) | **32,284** | 21.6% | 0.86 | 44% | 34% | 17% | 3% | 3% |
| Two or more races | **1,890** | 17.6% | 0.70 | 52% | 32% | 12% | 1% | 2% |
| | | | | | | | | |
| Migrant | **203** | 7.6% | 0.31 | 75% | 19% | 5% | 0% | 0% |
| | | | | | | | | |
| English Learner | **1,897** | 3.7% | 0.15 | 87% | 11% | 2% | 0% | 0% |
| | | | | | | | | |
| Economically Disadvantaged | **24,668** | 15.0% | 0.60 | 57% | 29% | 11% | 1% | 1% |
| | | | | | | | | |
| Students with Disabilities | **4,438** | 6.5% | 0.26 | 81% | 14% | 4% | 1% | 1% |

* Calculator section

# Rubric

| Rubric | |
|---|---|
| **Score Point 4** | Student scores 4 points. |
| **Score Point 3** | Student scores 3 or 3.5 points. |
| **Score Point 2** | Student scores 2 or 2.5 points. |
| **Score Point 1** | Student scores 0.5, 1, or 1.5 points. **OR**<br>Student demonstrates a minimal understanding of creating an inequality in one variable and using it to a solve problem. |
| **Score Point 0** | Student response is completely incorrect or irrelevant. |
| **Blank** | No student response. |
| **Score Points** | **Part A**<br>• Score 2 points:<br>  ○ Correct answer of $12 and correct inequality.<br>• Score 1.5 points:<br>  ○ Correct answer of $12 and did not use the "equal to" when setting up the correct inequality. **OR**<br>  ○ Correct inequality, 12x+1280≥1500, without identifying the correct dollar amount Katie is paid for overtime. **OR**<br>  ○ One mistake with correct work shown for the otherwise correct inequality using the correct “equal to”.<br>• Score 1 point:<br>  ○ Correct answer of $12 and an incorrect inequality. **OR**<br>  ○ Correct inequality, [gap1]x+1280≥1500, based on an incorrect answer for Katie’s hourly overtime rate, where [gap1] refers to the incorrect value for overtime pay rate.<br>• Score 0.5 point:<br>  ○ Correct inequality excluding the use of the correct "equal to" with an incorrect or missing answer for Katie’s hourly overtime rate. **OR**<br>  ○ $12 and no inequality.<br>**Part B**<br>• Score 2 points:<br>  ○ Correct and reasonable answer based on the solution to the inequality from Part A with all work shown. **OR**<br>  ○ Correct answer of “at least 19 hours” with all work shown (did not use the inequality from Part A).<br>• Score 1.5 points:<br>  ○ Correct solution 18 1/3 with all work shown but did not correctly answer the question in terms of the context, i.e. rounded to a whole hour increment.<br>• Score 1 point:<br>  ○ Correct answer with incorrect or no work shown. **OR** |

| | |
|---|---|
| | ○ Minor error in work results in a reasonable solution in regards to the context.<br>• Score 0.5 point:<br>○ Correct work and solution for an incorrect inequality where the inequality does not make sense in regards to the context. |
| **Correct Answers** | **Part A**<br>$12<br>12x+1280≥1500<br>**Part B**<br>12x+1280≥1500<br>12x≥220<br>X≥$18\frac{1}{3}$<br>**OR**<br>12x+1280≥1500<br>12x≥220<br>x≥$18.\overline{33}$<br>Katie would need to work at least 19 hours of overtime.<br>Note:<br>Part B is dependent on Part A, student should not be penalized for correctly solving an incorrect inequality from Part A as long as the inequality makes sense with the context. |

# Anchor Set

## A1

**Part A**
4 + 40x = 1,500
x = 37.4
She gets paid 4.675 dollars each overtime hour.

**Part B**
4 + 40x = 1,500
x = 37.4
She would have to work at least 5 total overtime hours.

### Anchor Annotation, Paper 1
### Score Point 0

The response receives no credit. The student demonstrates no understanding of the given task.

**Part A, SP: 0**
The student response is completely incorrect or irrelevant. The student provides an incorrect answer (*paid 4.675 dollars each overtime hour*) and no inequality. The student provides an equation instead.

**Part B, SP: 0**
The student response is completely incorrect or irrelevant. The student provides an incorrect answer (*work at least 5 total overtime hours*) with incorrect work.

## A2

**Part A**
Katie gets paid an extra amount of $4 for every hour of overtime.
Katie would have to work an total of 375 hours worth of hour time only to get $1500

**Part B**
1500/4 = 375 She gets only 4 extra dollars per hour of overtime therefore she only needs to work an extra of 375 more hours to get a total of $1500

### Anchor Annotation, Paper 2
### Score Point 0

The response receives no credit. The student demonstrates no understanding of the given task.

**Part A, SP: 0**
The student response is completely incorrect or irrelevant.
The student provides an incorrect answer (*paid an eatra amount of $4 for every hour of overtime*) and no inequality. The prompt asks for the total hourly overtime pay not the extra amount above her regular hourly rate.

**Part B, SP: 0**
The student response is completely incorrect or irrelevant. The student provides an incorrect answer (*work an extra of 375 more hours*) with incorrect work.

# A3

**Part A**
The amount Katie is paid for each overtime is $11.27.
y = 8x + b
40x = 320
320/7 = 45.5 dollars a week including the overtime

**Part B**
To get $1,550 in the next week she would have to work at least 12 hours of overtime
1550/4 = 38.54
That would be how much money she would make in overtime

## Anchor Annotation, Paper 3
## Score Point 0

The response receives no credit. The student demonstrates no understanding of the given task.

**Part A, SP: 0**
The student response is completely incorrect or irrelevant. The student provides an incorrect answer (*$11.27*) and no inequality. The student provides an equation instead.

**Part B, SP: 0**
The student response is completely incorrect or irrelevant. The student provides an incorrect answer (*work at least 12 hours of overtime*) with incorrect work.

# A4

**Part A**
She would have to work 19 overtime hours.

**Part B**
She would have to work 19 overtime hours.... again.

## Anchor Annotation, Paper 4
## Score Point 1

The response receives partial credit. The student demonstrates a minimal understanding of the given task.

**Part A, SP: 0**
The student response is completely incorrect or irrelevant. The student provides an incorrect answer (*work 19 overtime hours*) and no inequality. The answer given is number of overtime hours rather than overtime pay rate.

**Part B, SP: 1**
- The student provides the correct answer (*work 19 overtime hours*) with incorrect or no work shown. This is the first bullet for score point 1 in rubric for Part B.

# A5

**Part A**
Katie would get paid $12 for each hour of overtime she works.

**Part B**
Katie would have to work 295 hours of overtime in order to get the amount of money she wants in a four week time period.

## Anchor Annotation, Paper 5
## Score Point 1

The response receives partial credit. The student demonstrates a minimal understanding of the given task.

**Part A, SP: 0.5**
- The student provides the correct answer (*$12 for each hour of overtime*) and no inequality. This is the second bullet for score point 0.5 in rubric for Part A.

**Part B, SP: 0**
The student response is completely incorrect or irrelevant. The student provides an incorrect answer (*work 295 hours of overtime*) with no work or explanation to award credit for process.

Per the rubric, a response that earns 0.5 points total for Parts A and B receives a holistic score of 1.

# A6

**Part A**
A. Katie is paid $12.00 for every overtime hour.
B. Katie would have to work 18.3 hours.

**Part B**
Katie would have to work 19 overtime hours.

## Anchor Annotation, Paper 6
## Score Point 1

The response receives partial credit. The student demonstrates a minimal understanding of the given task.

**Part A, SP: 0.5**
- The student provides the correct answer (*$12.00 for every overtime hour*) and no inequality. This is the second bullet for score point 0.5 in the rubric for Part A.

**Part B, SP: 1**
- Correct answer (*work 19 overtime hours*) with incorrect or no work shown. This is the first bullet for score point 1 in the rubric for Part B.

Per the rubric, a response that earns 1.5 points total for Parts A and B receives a holistic score of 1.

**Part A**
Katie is paid $12 for each overtime hour.
Katie would need to work overtime for about 18 hours and 25 minutes

**Part B**
x = overtime hours
12x + (8 x 4) 40 = 1500
12x + 1280 = 1500
12x = 220
x = 18.4
Katie would need to work 19 hours overtime

## Anchor Annotation, Paper 7
## Score Point 2

The response receives partial credit. The student demonstrates a limited understanding of the given task.

**Part A, SP: 0.5**

- The student provides the correct answer (*. . . $12 for each overtime hour*) and no inequality. This is the second bullet for score point 0.5 in the rubric for Part A.

**Part B, SP: 2**

- The student provides the correct answer (*. . . work 19 hours overtime*) with all work shown (12x+1280=1500*;* 12x=220). The student provided no inequality in Part A but did include an equation and work in Part B that is based on the appropriate inequality. This is the second bullet for score point 2 in the rubric for Part B.

Per the rubric, a response that earns 2.5 points total for Parts A and B receives a holistic score of 2.

**Part A**
Katie would have to work 18 overtime hours.
12 (x) ≥ 220

**Part B**
19 hours. 1500 - 1280 = 220  220/12 = 18.3333 so she would have to work 19 hours because of only being able to work in hour increments.

## Anchor Annotation, Paper 8
## Score Point 2

The response receives partial credit. The student demonstrates a limited understanding of the given task.

**Part A, SP: 0**
The student response is completely incorrect or irrelevant.
The student provides an incorrect answer (*. . . 18 overtime hours*). This should be rate of overtime pay not number of hours. The inequality (12(x)≥220) is missing the original values expected in the correct inequality so it does not make sense related to the context of the prompt.

**Part B, SP: 2**

- The student provides a correct and reasonable answer based on the solution to the inequality from Part A (*. . . work 19 hours*) with all work shown (1500−1280=220*;* 22012=18.3333). The first line of work shows how the student got the value of 220 in their inequality from Part A.

**Part A**
- 12 dollars every overtime hour.
- 1500 = 4 (40 (8)) + 12x

**Part B**
1500 = 4 (40 (8)) + 12x
1500 = 1280 + 12x
220 = 12x
x = 18.333333
since she can't work a third of an hour, she will have to round up and work 19 overtime hours.

## Anchor Annotation, Paper 9
## Score Point 2

The response receives partial credit. The student demonstrates a limited understanding of the given task.

**Part A, SP: 0.5**

- The student provides the correct answer (*12 dollars every overtime hour*) and no inequality (1500=4(40(8))+12x). The student has all the terms for the correct inequality but writes it as an equation using an equal symbol. The hyphens were interpreted as bullets not minus signs. This is the second bullet for score point 0.5 in rubric for Part A.

**Part B, SP: 2**

- The student provides a correct and reasonable answer based on the solution to the inequality from Part A (. . . *work 19 overtime hours*) with all work shown (1500=1280+12x*;* 220=12x*;* x=18.333333). The student provided an equation in Part A but knew to round up answer to next whole number for overtime hours. This is the first bullet for score point 2 in rubric for Part B.

Per the rubric, a response that earns 2.5 points total for Parts A and B receives a holistic score of 2.

**Part A**
a.) 8 ÷ 2 = 4
8 + 4 = 12
$12 for each overtime hour
b.) 1500 ≥ (8) x 40)(4) + 12x

**Part B**
(8 x 40) = 320
320 x 4 = 1280
1500 - 1280 = 220
220 ÷ 12 = 18.3333333333...
Katie would have to work 19 hours in the next 4 weeks to make at least $1500.

## Anchor Annotation, Paper 10
## Score Point 3

The response receives partial credit. The student demonstrates a general understanding of the given task.

**Part A, SP: 1**

- The student provides the correct answer (*$12 for each over time hour*) and an incorrect inequality ($1500 \geq (8 \times 40)(4) + 12x$). The student has all the terms for the correct inequality but reversed the direction of the inequality symbol. This is the first bullet for score point 1.5 in the rubric for Part A

**Part B, SP: 2**

- The student provides a correct answer (*. . . work 19 hours*) with all work shown ($1500 - 1280 = 220$; $220 \div 12 = 18.3333333333\ldots$) but didn't use the inequality from Part A. With the inequality reversed in Part A, student should have gone down to the next whole number. Disregard this error since score was already deducted in Part A for wrong direction of inequality symbol. This is the second bullet for score point 2 in the rubric for Part B.

**Part A**
She earns $12 each hour when working overtime.
1500 < 1280 + 12x

**Part B**
1500 < 1280 + 12x
220 = 12x
x = 18.3333
x = 19
She will have to work 19 overtime hours.

## Anchor Annotation, Paper 11
## Score Point 3

The response receives partial credit. The student demonstrates a general understanding of the given task.

**Part A, SP: 1.5**

- The student provides the correct answer (*. . . $12 each hour*) and did not use the "equal to" when setting up the correct inequality (1500<1280+12x). The student has switched all values on both sides of the inequality from the inequality given in the rubric but has also correctly changed the direction of the inequality symbol. This is the first bullet for score point 1.5 in the rubric for Part A

**Part B, SP: 2**

- The student provides a correct and reasonable answer based on the solution to the inequality from Part A (*. . . work 19 overtime hours*) with all work shown (220=12x; x=18.33333). This is the first bullet for score point 2 in the rubric for Part B

Per the rubric, a response that earns 3.5 points total for Parts A and B receives a holistic score of 3.

**Part A**
8 (40) + ot = r  ot = 8 (1.5) = 12
4 (320) + ot (12) ≥ 1500

**Part B**
4 (320) + x (12) = 1500
x = 18.3

## Anchor Annotation, Paper 12
## Score Point 3

The response receives partial credit. The student demonstrates a general understanding of the given task.

**Part A, SP: 2**

- The student provides the correct answer (ot=8(1.5)=12) and correct inequality (4(320)+ot(12)≥1500). The answer does not require a label since it was given in the prompt. The letters *ot* used in the inequality are seen together as one variable.

**Part B, SP: 1**

- The student provides a correct answer (x=18.3) with incorrect or no work shown. The student essentially restates the inequality from Part A which is missing intermediate work. Also, the student did not correctly answer the question in terms of the context, i.e. rounding up to a whole hour. This is the first bullet for score point 2 in the rubric for Part B.

**Part A**
Katie is paid $12 for each overtime hour she works.
1,280 + 12x ≥ 1,500

**Part B**
Katie will have to work 19 hours in order to make at least $1,500
1,280 + 12x ≥ 1,500
1,280 + 12 x (19) = $1,508

## Anchor Annotation, Paper 13
## Score Point 4

The response receives full credit. The student demonstrates a complete and thorough understanding of the given task.

**Part A, SP: 2**

- The student provides the correct answer (*. . . $12 for each overtime hour*) and correct inequality (1,280+12x≥1,500).

**Part B, SP: 2**

- The student provides a correct and reasonable answer based on the solution to the inequality from Part A (*Katie will have to work 19 hours*) with all work shown (1,280+12×(19)=$1,508). This response uses a guess and check method, which is acceptable. This is the first bullet for score point 2 in the rubric for Part B.

**Part A**
For each overtime hour Katie is paid 12 dollars.
$1500 \leq 1280 + 12x$

**Part B**
Katie would have to work 19 full hours of overtime to make at least $1500.
1500 - 1280 = 220  220 ÷ 12 = 18.33 = 19 overtime hours

## Anchor Annotation, Paper 14
## Score Point 4

The response receives full credit. The student demonstrates a complete and thorough understanding of the given task.

**Part A, SP: 2**

- The student provides the correct answer (*. . . 12 dollars*) and correct inequality ($1500 \leq 1280+12x$). The student has switched all values on both sides of the inequality from the inequality given in the rubric but has also correctly changed the direction of the inequality symbol.

**Part B, SP: 2**

- The student provides a correct and reasonable answer based on the solution to the inequality from Part A (*. . . 19 full hours of overtime*) with all work shown ($1500-1280=220$; $220\div12=18.33$). This is the first bullet for score point 2 in the rubric for Part B.

**Part A**
Katie gets paid $12 an hour for each overtime hour.
Katie makes $320 a week working 40 hours a week, which puts her making $1280 in four weeks. This means she needs to make $220 to make at least a total of $1500.
$12x + $1280 ≥ $1500

**Part B**
$12x + $1280 ≥ $1500
-1280 on both sides
12x ≥ 220
12 ÷ 12  220 ÷ 12
x ≥ 18.3 repeating
Katie would have to work at least 19 hours of overtime to make at least $1500.

## Anchor Annotation, Paper 15
## Score Point 4

The response receives full credit. The student demonstrates a complete and thorough understanding of the given task.

**Part A, SP: 2**

- The student provides the correct answer ($12 an hour) and correct inequality ($12x+$1280≥$1500).

**Part B, SP: 2**

- The student provides a correct and reasonable answer based on the solution to the inequality from Part A (. . . at least 19 hours of overtime) with all work shown (. . . 12x≥220; 220÷12; x≥18.3 repeating). This is the first bullet for score point 2 in the rubric for Part B.

**4**

MA1019045_2

Which expression is equivalent to $(x^2 + y)(x + y^2)$?

**A** $x^3 + y^3$

**B** $x^3 + x^2y^2 + xy + y^3$

**C** $x^3 + 2xy + y^3$

**D** $x^3 + 2x^2y^2 + y^3$

# Released Item Performance

## Kentucky Summative Assessments

**Spring 2024**
**Grade 10**
**Mathematics**

**Item:** MA1019045*
**Book Question Number:** 4

**Standard:** KY.HS.A.5

**Item Type:** MC
**Key:** B

| Student Group | Number of Students | Percent Correct | Average Item Score | Item Breakout Statistics - Answer Choice Options | | | |
|---|---|---|---|---|---|---|---|
| | | | | A (%) | B (%) | C (%) | D (%) |
| *All Students* | **49,384** | 35% | 0.35 | 44% | 35% | 15% | 7% |
| *Gender* | | | | | | | |
| Female | **24,205** | 34% | 0.34 | 46% | 34% | 13% | 6% |
| Male | **25,178** | 35% | 0.35 | 41% | 35% | 16% | 7% |
| *Ethnicity* | | | | | | | |
| African American | **5,468** | 29% | 0.29 | 43% | 29% | 20% | 8% |
| American Indian or Alaska Native | **62** | 27% | 0.27 | 42% | 27% | 21% | 10% |
| Asian | **921** | 59% | 0.59 | 28% | 59% | 9% | 4% |
| Hispanic or Latino | **4,872** | 30% | 0.30 | 44% | 30% | 17% | 8% |
| Native Hawaiian or Pacific Islander | **96** | 30% | 0.30 | 43% | 30% | 19% | 8% |
| White (non-Hispanic) | **35,740** | 36% | 0.36 | 44% | 36% | 13% | 6% |
| Two or more races | **2,222** | 34% | 0.34 | 43% | 34% | 16% | 6% |
| | | | | | | | |
| Migrant | **242** | 26% | 0.26 | 44% | 26% | 21% | 8% |
| | | | | | | | |
| English Learner | **2,436** | 28% | 0.28 | 40% | 28% | 22% | 10% |
| | | | | | | | |
| Economically Disadvantaged | **28,647** | 29% | 0.29 | 46% | 29% | 17% | 8% |
| | | | | | | | |
| Students with Disabilities | **5,240** | 30% | 0.30 | 37% | 30% | 22% | 10% |

* Calculator section

MA1020036_stimulus

The owner of a fitness center created a function, $g(x)$, that models the number of fitness center members at the end of each month, $x$ months after lowering the price of membership. The values shown in the table represent the function $g(x)$.

| $x$ | $g(x)$ |
|---|---|
| 1 | 85 |
| 2 | 170 |
| 3 | 340 |

Formula_HS_F_7_b

| | Formula |
|---|---|
| Arithmetic Sequence | $a_n = a_1 + (n-1)d$ |
| Geometric Sequence | $a_n = a_1 r^{n-1}$ |

**5**

MA1020036_2720

Based on the function, what is the number of fitness center members that the owner can expect to have 6 months after lowering the price of membership?

Enter your answer in the box.

# Released Item Performance

## Kentucky Summative Assessments

**Spring 2024**
**Grade 10**
**Mathematics**

**Item:** MA1020036*
**Book Question Number:** 5

**Standard:** KY.HS.F.7.b

**Item Type:** SA
**Key:** Rubric

| Student Group | Number of Students | Percent Correct | Average Item Score | Item Breakout Statistics - Score Percentages | |
|---|---|---|---|---|---|
| | | | | Score 0 (%) | Score 1 (%) |
| *All Students* | **35,387** | 35.0% | 0.35 | 65% | 35% |
| *Gender* | | | | | |
| Female | **17,767** | 33.9% | 0.34 | 66% | 34% |
| Male | **17,620** | 36.1% | 0.36 | 64% | 36% |
| *Ethnicity* | | | | | |
| African American | **3,712** | 20.4% | 0.20 | 80% | 20% |
| American Indian or Alaska Native | **44** | 22.7% | 0.23 | 77% | 23% |
| Asian | **670** | 51.9% | 0.52 | 48% | 52% |
| Hispanic or Latino | **3,297** | 26.1% | 0.26 | 74% | 26% |
| Native Hawaiian or Pacific Islander | **62** | 27.4% | 0.27 | 73% | 27% |
| White (non-Hispanic) | **25,997** | 38.0% | 0.38 | 62% | 38% |
| Two or more races | **1,604** | 31.6% | 0.32 | 68% | 32% |
| | | | | | |
| Migrant | **128** | 19.5% | 0.20 | 80% | 20% |
| | | | | | |
| English Learner | **1,416** | 10.4% | 0.10 | 90% | 10% |
| | | | | | |
| Economically Disadvantaged | **20,005** | 27.9% | 0.28 | 72% | 28% |
| | | | | | |
| Students with Disabilities | **1,951** | 14.6% | 0.15 | 85% | 15% |

* Calculator section

MA1020059_stimulus

Circle A is centered at the origin of a coordinate plane with a radius of 4. Circle B is a dilation of circle A by a scale factor of $n$, centered at the point $(x, y)$.

Formula_HS_G_15

| | **Formula** |
|---|---|
| Area | $A = \pi r^2$ |
| Circumference | $C = \pi d$<br>$C = 2\pi r$ |

**6**

MA1020059_3

Which statement about circle A and circle B is true?

**A** Circle A and circle B are only similar when $n = 4$.

**B** Circle A and circle B are only similar when $x = 0$ and $y = 0$.

**C** Circle A and circle B are always similar for all values of $x$, $y$, and $n$.

**D** Circle A and circle B are never similar because a dilation changes the size of a circle.

# Released Item Performance

## Kentucky Summative Assessments

**Spring 2024**
**Grade 10**
**Mathematics**

**Item:** MA1020059*
**Book Question Number:** 6

**Standard:** KY.HS.G.15

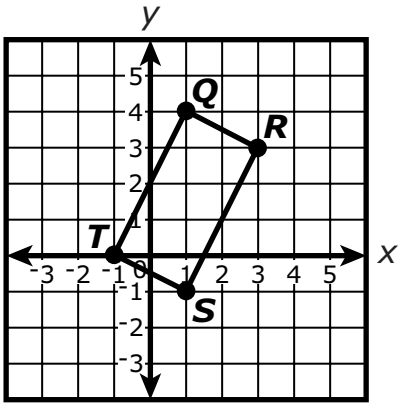
**Item Type:** MC
**Key:** C

| Student Group | Number of Students | Percent Correct | Average Item Score | Item Breakout Statistics - Answer Choice Options | | | |
|---|---|---|---|---|---|---|---|
| | | | | A (%) | B (%) | C (%) | D (%) |
| *All Students* | **25,870** | 30% | 0.30 | 18% | 20% | 30% | 32% |
| *Gender* | | | | | | | |
| Female | **13,002** | 28% | 0.28 | 18% | 19% | 28% | 34% |
| Male | **12,868** | 32% | 0.32 | 18% | 20% | 32% | 30% |
| *Ethnicity* | | | | | | | |
| African American | **2,819** | 31% | 0.31 | 16% | 22% | 31% | 31% |
| American Indian or Alaska Native | **32** | 25% | 0.25 | 16% | 16% | 25% | 44% |
| Asian | **494** | 33% | 0.33 | 13% | 19% | 33% | 35% |
| Hispanic or Latino | **2,452** | 29% | 0.29 | 19% | 19% | 29% | 33% |
| Native Hawaiian or Pacific Islander | **44** | 27% | 0.27 | 11% | 34% | 27% | 27% |
| White (non-Hispanic) | **18,839** | 30% | 0.30 | 18% | 20% | 30% | 32% |
| Two or more races | **1,189** | 31% | 0.31 | 18% | 17% | 31% | 33% |
| | | | | | | | |
| Migrant | **100** | 30% | 0.30 | 18% | 15% | 30% | 37% |
| | | | | | | | |
| English Learner | **1,078** | 31% | 0.31 | 18% | 20% | 31% | 30% |
| | | | | | | | |
| Economically Disadvantaged | **14,692** | 30% | 0.30 | 19% | 20% | 30% | 32% |
| | | | | | | | |
| Students with Disabilities | **1,471** | 33% | 0.33 | 19% | 20% | 33% | 29% |

* Calculator section

MA1020064_stimulus

The graph of rectangle QRST is shown on the coordinate plane.




Formula_HS_G_23_24

| | Formula |
|---|---|
| Distance | $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ |
| Midpoint | $M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$ |

**7**

MA1020064_3

What is the perimeter, in units, of the rectangle?

**A** $3\sqrt{5}$

**B** 10

**C** $6\sqrt{5}$

**D** 20

# Released Item Performance

## Kentucky Summative Assessments

**Spring 2024**
**Grade 10**
**Mathematics**

**Item:** MA1020064*
**Book Question Number:** 7

**Standard:** KY.HS.G.24.a

**Item Type:** MC
**Key:** C

| Student Group | Number of Students | Percent Correct | Average Item Score | Item Breakout Statistics - Answer Choice Options | | | |
|---|---|---|---|---|---|---|---|
| | | | | A (%) | B (%) | C (%) | D (%) |
| *All Students* | **23,804** | 35% | 0.35 | 27% | 27% | 35% | 11% |
| *Gender* | | | | | | | |
| Female | **11,410** | 33% | 0.33 | 29% | 27% | 33% | 11% |
| Male | **12,393** | 37% | 0.37 | 26% | 26% | 37% | 11% |
| *Ethnicity* | | | | | | | |
| African American | **2,754** | 31% | 0.31 | 31% | 28% | 31% | 10% |
| American Indian or Alaska Native | **32** | 44% | 0.44 | 19% | 28% | 44% | 9% |
| Asian | **421** | 52% | 0.52 | 20% | 20% | 52% | 7% |
| Hispanic or Latino | **2,528** | 33% | 0.33 | 28% | 28% | 33% | 10% |
| Native Hawaiian or Pacific Islander | **46** | 37% | 0.37 | 28% | 24% | 37% | 11% |
| White (non-Hispanic) | **16,955** | 36% | 0.36 | 27% | 26% | 36% | 11% |
| Two or more races | **1,066** | 33% | 0.33 | 28% | 27% | 33% | 12% |
| | | | | | | | |
| Migrant | **167** | 34% | 0.34 | 33% | 25% | 34% | 8% |
| | | | | | | | |
| English Learner | **1,381** | 30% | 0.30 | 32% | 27% | 30% | 10% |
| | | | | | | | |
| Economically Disadvantaged | **14,133** | 33% | 0.33 | 28% | 28% | 33% | 11% |
| | | | | | | | |
| Students with Disabilities | **3,834** | 35% | 0.35 | 29% | 26% | 35% | 10% |

* Calculator section

**8**

MA1020084_3

A factory manager collected data to create a linear model that predicts the number of products that will be defective based on the total number of items produced on an assembly line. The correlation coefficient of the model is 0.52. What does the correlation coefficient reveal about the relationship?

**A** There is a strong positive correlation between items produced and defective items.

**B** There is a strong negative correlation between items produced and defective items.

**C** There is a positive correlation between items produced and defective items, but the correlation is not strong.

**D** There is a negative correlation between items produced and defective items, but the correlation is not strong.

# Released Item Performance

## Kentucky Summative Assessments

**Spring 2024**
**Grade 10**
**Mathematics**

**Item:** MA1020084*
**Book Question Number:** 8

**Standard:** KY.HS.SP.8.b

**Item Type:** MC
**Key:** C

| Student Group | Number of Students | Percent Correct | Average Item Score | Item Breakout Statistics - Answer Choice Options | | | |
|---|---|---|---|---|---|---|---|
| | | | | A (%) | B (%) | C (%) | D (%) |
| *All Students* | **25,544** | 52% | 0.52 | 17% | 18% | 52% | 14% |
| *Gender* | | | | | | | |
| Female | **12,787** | 55% | 0.55 | 15% | 17% | 55% | 14% |
| Male | **12,757** | 49% | 0.49 | 19% | 18% | 49% | 14% |
| *Ethnicity* | | | | | | | |
| African American | **2,706** | 48% | 0.48 | 15% | 22% | 48% | 15% |
| American Indian or Alaska Native | **30** | 47% | 0.47 | 17% | 17% | 47% | 20% |
| Asian | **498** | 63% | 0.63 | 16% | 11% | 63% | 9% |
| Hispanic or Latino | **2,344** | 50% | 0.50 | 16% | 20% | 50% | 14% |
| Native Hawaiian or Pacific Islander | **50** | 54% | 0.54 | 6% | 22% | 54% | 18% |
| White (non-Hispanic) | **18,766** | 53% | 0.53 | 17% | 17% | 53% | 14% |
| Two or more races | **1,149** | 48% | 0.48 | 17% | 19% | 48% | 15% |
| | | | | | | | |
| Migrant | **76** | 49% | 0.49 | 13% | 22% | 49% | 16% |
| | | | | | | | |
| English Learner | **1,053** | 44% | 0.44 | 17% | 22% | 44% | 16% |
| | | | | | | | |
| Economically Disadvantaged | **14,490** | 50% | 0.50 | 16% | 19% | 50% | 15% |
| | | | | | | | |
| Students with Disabilities | **1,403** | 44% | 0.44 | 18% | 22% | 44% | 16% |

* Calculator section


*Investing in Kentucky's Future, One Student at a Time*