

Kentucky Summative Assessments



Grade 10 Mathematics **Released Items** 2026

**1**

MA1019145_4

Which expression has a value of 16?

A $\frac{1}{2}(4^2)$

B $\frac{1}{2}(16^2)$

C $\left(4\frac{1}{2}\right)^2$

D $\left(16\frac{1}{2}\right)^2$



Released Item Performance

Kentucky Summative Assessments

Spring 2026
Grade 10
Mathematics

Item: MA1019145

Book Question Number: 1

Standard: KY.HS.N.1

Item Type: MC

Key: D

Student Group	Number of Students	Percent Correct	Average Item Score	Item Breakout Statistics - Answer Choice Options			
				A (%)	B (%)	C (%)	D (%)
All Students	28,124	32%	0.32	17%	25%	25%	32%
Gender							
Female	13,299	29%	0.29	19%	25%	27%	29%
Male	14,824	35%	0.35	16%	25%	23%	35%
Ethnicity							
African American	3,145	24%	0.24	22%	25%	29%	24%
American Indian or Alaska Native	35	26%	0.26	29%	23%	23%	26%
Asian	586	52%	0.52	13%	16%	19%	52%
Hispanic or Latino	3,016	27%	0.27	20%	25%	28%	27%
Native Hawaiian or Pacific Islander	58	21%	0.21	26%	12%	41%	21%
White (non-Hispanic)	19,823	34%	0.34	16%	25%	25%	34%
Two or more races	1,458	31%	0.31	17%	28%	25%	31%
Migrant							
Migrant	129	22%	0.22	19%	28%	30%	22%
English Learner							
English Learner	1,884	21%	0.21	24%	26%	28%	21%
Economically Disadvantaged							
Economically Disadvantaged	15,852	27%	0.27	20%	26%	27%	27%
Students with Disabilities							
Students with Disabilities	4,210	29%	0.29	18%	29%	24%	29%



2

MA1021060_1

During a fundraiser, the amount of money, in dollars, collected after x days by students and teachers combined can be modeled by the function $f(x) = 48 + 4(x - 6)$. The amount of money that only the teachers collected after x days can be modeled by the function $g(x) = 2(x + 5)$. Which function models the amount of money the students collected, $k(x)$?

- A** $k(x) = 2x + 14$
- B** $k(x) = 2x + 37$
- C** $k(x) = 6x + 34$
- D** $k(x) = 6x + 82$



Released Item Performance

Kentucky Summative Assessments

Spring 2026
Grade 10
Mathematics

Item: MA1021060

Book Question Number: 2

Standard: KY.HS.F.6.b

Item Type: MC

Key: A

Student Group	Number of Students	Percent Correct	Average Item Score	Item Breakout Statistics - Answer Choice Options			
				A (%)	B (%)	C (%)	D (%)
All Students	18,541	33%	0.33	33%	26%	34%	6%
Gender							
Female	9,218	33%	0.33	33%	24%	35%	7%
Male	9,323	33%	0.33	33%	28%	33%	5%
Ethnicity							
African American	2,011	25%	0.25	25%	32%	35%	8%
American Indian or Alaska Native	25	32%	0.32	32%	28%	32%	8%
Asian	423	52%	0.52	52%	17%	27%	4%
Hispanic or Latino	1,892	28%	0.28	28%	30%	35%	7%
Native Hawaiian or Pacific Islander	39	36%	0.36	36%	36%	26%	3%
White (non-Hispanic)	13,201	35%	0.35	35%	25%	34%	6%
Two or more races	948	31%	0.31	31%	28%	36%	6%
Migrant							
Migrant	59	25%	0.25	25%	25%	39%	10%
English Learner							
English Learner	893	23%	0.23	23%	36%	34%	7%
Economically Disadvantaged							
Economically Disadvantaged	10,083	28%	0.28	28%	29%	36%	7%
Students with Disabilities							
Students with Disabilities	1,031	24%	0.24	24%	35%	32%	9%

**3**

MA1020013_2

Erin and Josh each purchased the same type of candy at a store. Erin purchased $3\frac{1}{4}$ pounds of chocolate and 4 pounds of caramel for a total cost of \$15.20. Josh purchased 2 pounds of chocolate and $5\frac{1}{2}$ pounds of caramel for a total cost of \$16.95. What was the cost, in dollars, per pound of chocolate at this store?

- A** 1.40
- B** 1.60
- C** 2.50
- D** 2.75



Released Item Performance

Kentucky Summative Assessments

Spring 2026

Grade 10

Mathematics

Item: MA1020013*

Book Question Number: 3

Standard: KY.HS.A.13

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	46,606	41%	0.41	11%	41%	34%	13%
Gender							
Female	22,507	39%	0.39	11%	39%	36%	14%
Male	24,098	43%	0.43	11%	43%	33%	12%
Ethnicity							
African American	5,134	37%	0.37	12%	37%	36%	16%
American Indian or Alaska Native	60	48%	0.48	12%	48%	27%	13%
Asian	1,008	51%	0.51	9%	51%	28%	12%
Hispanic or Latino	4,900	38%	0.38	11%	38%	36%	14%
Native Hawaiian or Pacific Islander	97	45%	0.45	9%	45%	35%	10%
White (non-Hispanic)	32,998	42%	0.42	11%	42%	34%	13%
Two or more races	2,404	40%	0.40	12%	40%	34%	14%
Migrant							
Migrant	188	35%	0.35	13%	35%	37%	15%
English Learner							
English Learner	2,772	33%	0.33	12%	33%	38%	17%
Economically Disadvantaged							
Economically Disadvantaged	25,897	38%	0.38	12%	38%	35%	14%
Students with Disabilities							
Students with Disabilities	5,230	33%	0.33	13%	33%	36%	18%

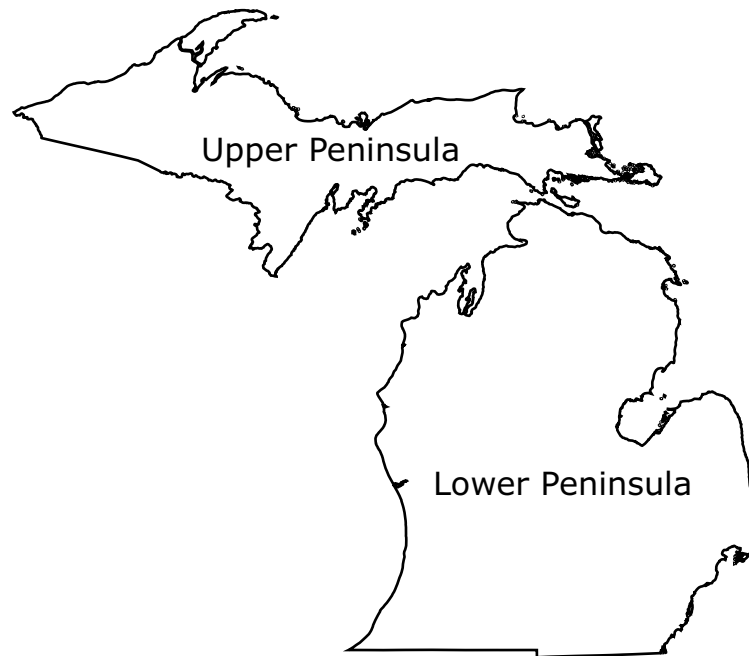
* Calculator section



4

MA1021134_4

The state of Michigan consists of two landmasses, the Upper Peninsula and the Lower Peninsula. A map of Michigan is shown.



The area of the Upper Peninsula is approximately 16,540 square miles. More than 90% of the Upper Peninsula is covered by forests. Which of these **best** describes the area covered by forests in the Upper Peninsula?

- A** Exactly 14,886 square miles
- B** Exactly 15,300 square miles
- C** Approximately 14,000 square miles
- D** Approximately 15,000 square miles



Released Item Performance

Kentucky Summative Assessments

Spring 2026
Grade 10
Mathematics

Item: MA1021134*

Book Question Number: 4

Standard: KY.HS.N.6

Item Type: MC

Key: D

Student Group	Number of Students	Percent Correct	Average Item Score	Item Breakout Statistics - Answer Choice Options			
				A (%)	B (%)	C (%)	D (%)
All Students	28,114	27%	0.27	39%	19%	15%	27%
Gender							
Female	13,297	27%	0.27	37%	20%	16%	27%
Male	14,816	27%	0.27	40%	18%	14%	27%
Ethnicity							
African American	3,142	22%	0.22	30%	27%	21%	22%
American Indian or Alaska Native	35	23%	0.23	31%	26%	20%	23%
Asian	588	36%	0.36	42%	11%	11%	36%
Hispanic or Latino	3,013	22%	0.22	35%	24%	19%	22%
Native Hawaiian or Pacific Islander	58	24%	0.24	36%	26%	14%	24%
White (non-Hispanic)	19,818	28%	0.28	41%	17%	14%	28%
Two or more races	1,457	27%	0.27	37%	19%	16%	27%
Migrant							
Migrant	129	16%	0.16	26%	40%	17%	16%
English Learner							
English Learner	1,885	20%	0.20	29%	30%	21%	20%
Economically Disadvantaged							
Economically Disadvantaged	15,840	25%	0.25	35%	22%	18%	25%
Students with Disabilities							
Students with Disabilities	4,206	20%	0.20	29%	27%	23%	20%

* Calculator section



MA1021081_2,4

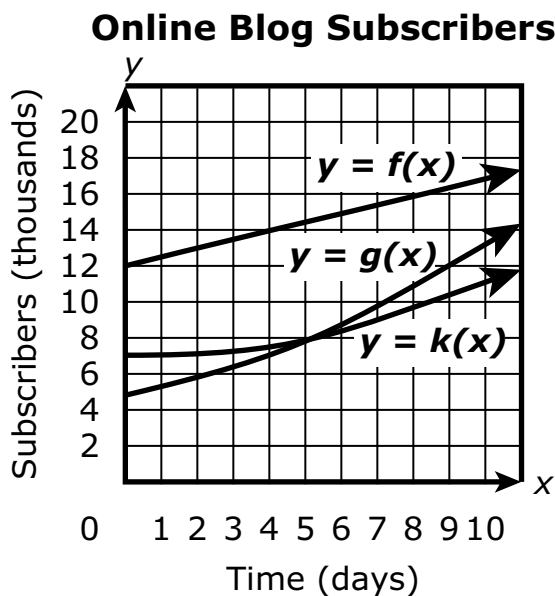
Fiona, Greg, and Kyra started a 20-day campaign to increase the number of subscribers for their online blogs. The numbers of subscribers for the three people, in thousands, after x days can be modeled by the following functions.

Fiona: $f(x) = 12 + 0.5x$

Greg: $g(x) = 5(1.1)^x$

Kyra: $k(x) = 7 + 0.04x^2$

The graphs of the functions are shown.



Which statements are true?

Select **two** correct answers.

- A** Greg will always have fewer subscribers than both Fiona and Kyra.
- B** After 15 days, Greg will have more subscribers than Fiona or Kyra.
- C** From Day 5 to Day 19, Greg had more subscribers than Fiona or Kyra.
- D** From Day 3 to Day 12, Fiona had more subscribers than Kyra or Greg.
- E** In the first 10 days, Fiona had the greatest increase in new subscribers.



Released Item Performance

Kentucky Summative Assessments

Spring 2026
Grade 10
Mathematics

Item: MA1021081

Book Question Number: 5

Standard: KY.HS.F.13

Item Type: MS

Key: B,D

Student Group	Number of Students	Percent Correct	Average Item Score	Item Breakout Statistics - Score Percentages		
				Score 0 (%)	Score 1 (%)	Score 2 (%)
All Students	46,244	62.4%	1.25	14%	46%	39%
Gender						
Female	22,354	61.2%	1.22	14%	49%	37%
Male	23,889	63.5%	1.27	15%	44%	41%
Ethnicity						
African American	5,062	54.6%	1.09	19%	52%	28%
American Indian or Alaska Native	59	50.0%	1.00	27%	46%	27%
Asian	1,003	70.4%	1.41	8%	43%	49%
Hispanic or Latino	4,794	57.2%	1.14	17%	51%	32%
Native Hawaiian or Pacific Islander	97	57.2%	1.14	14%	57%	29%
White (non-Hispanic)	32,833	64.2%	1.28	13%	45%	42%
Two or more races	2,391	61.3%	1.23	15%	47%	38%
Migrant						
Migrant	183	53.3%	1.07	21%	52%	27%
English Learner						
English Learner	2,645	50.9%	1.02	22%	54%	24%
Economically Disadvantaged						
Economically Disadvantaged	25,641	58.2%	1.16	17%	49%	33%
Students with Disabilities						
Students with Disabilities	5,131	51.6%	1.03	22%	52%	25%



6

MA1020153

The coordinates of three vertices of quadrilateral $KLMN$ are $K(1, 2)$, $L(4, 1)$, and $M(2, -5)$.

- Determine the coordinates of point N such that $KLMN$ is a rectangle.
- Use the coordinates of the quadrilateral to justify your answer.

Enter your answer and your justification in the space provided.



Released Item Performance

Kentucky Summative Assessments

Spring 2026
Grade 10
Mathematics

Item: MA1020153*

Book Question Number: 6

Standard: KY.HS.G.21

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	27,862	13.6%	0.27	76%	20%	3%
Gender						
Female	13,680	13.1%	0.26	77%	20%	3%
Male	14,181	14.1%	0.28	76%	21%	4%
Ethnicity						
African American	2,654	5.6%	0.11	90%	9%	1%
American Indian or Alaska Native	34	4.4%	0.09	91%	9%	0%
Asian	648	24.2%	0.48	62%	28%	10%
Hispanic or Latino	2,825	9.8%	0.20	82%	16%	2%
Native Hawaiian or Pacific Islander	65	14.6%	0.29	74%	23%	3%
White (non-Hispanic)	20,246	14.9%	0.30	74%	22%	4%
Two or more races	1,386	13.0%	0.26	77%	19%	3%
Migrant						
Migrant	119	5.0%	0.10	91%	8%	1%
English Learner						
English Learner	1,532	3.2%	0.06	94%	6%	0%
Economically Disadvantaged						
Economically Disadvantaged	15,097	9.7%	0.19	83%	15%	2%
Students with Disabilities						
Students with Disabilities	3,517	4.6%	0.09	92%	8%	1%

* Calculator section

Rubric

Rubric	
Score Point 2	Student demonstrates a complete understanding of using coordinates to justify and prove simple geometric theorems algebraically.
Score Point 1	Student demonstrates a partial understanding of using coordinates to justify and prove simple geometric theorems algebraically.
Score Point 0	Student response is insufficient to demonstrate a grade-appropriate, relevant understanding of the task.
Score Points	• Score 2 points: ○ Correct location of point N and valid justification using coordinates of the points that the quadrilateral is a rectangle • Score 1 point ○ Correct location of point N with no justification OR ○ Complete justification with an incorrect or missing location of N ○ Incomplete or partial justification with a mathematical error leading to an incorrect location of point N
Correct Answers	The location of point N is $(-1, -4)$. I can prove that the rectangle has four right angles by finding the slope of the lines through each side. If the slopes are negative reciprocals then they form a right angle. If they are the same, then the sides are parallel. Slope of $\overline{KL}$: $m = \frac{1-2}{4-1} = -\frac{1}{3}$ Slope of $\overline{LM}$: $m = \frac{-5-1}{2-4} = 3$ Slope of $\overline{MN}$: $m = \frac{-5-(-4)}{2-(-1)} = -\frac{1}{3}$ Slope of $\overline{NK}$: $m = \frac{-4-2}{-1-1} = 3$ Note: Other valid explanations and methods are acceptable.

Anchor Set

A1

N(5,2)

Anchor Annotation, Paper 1

Score Point 0

This response receives no credit. It includes neither of the two required elements.

An incorrect location of point N (5,2) is provided.

No attempt is made to justify that quadrilateral KLMN is a rectangle.

A2

Point N would be like point M. x would be positive and y would be negative.

Anchor Annotation, Paper 2

Score Point 0

This response receives no credit. It includes neither of the two required elements.

The correct location of point N is not provided.

An invalid justification is provided to show that quadrilateral KLMN is a rectangle. The justification does not use the given coordinates and is insufficient to earn credit.

A3

N would be (4,-6) because with the other coordinates this is the only other one that would end up making the rectangle. I say this because K (1,2) and L (4,1) make the start of the rectangle above the x axis while if M (2,-5) would be the start you'd have to go down by 1 and to the right by 2 to finish the rectangle below the x axis.

Anchor Annotation, Paper 3

Score Point 0

This response receives no credit. It includes neither of the two required elements.

Incorrect location of point N (4,-6) is provided.

An invalid justification is provided to show that quadrilateral KLMN is a rectangle. The response should move up 1 and left 3, not down 1 and right 2. Because the coordinates of KLMN are in cyclic order, the transformation from K to L is the opposite of the transformation from M to N.

A4

The cordnates of point N would be $(-1, -4)$ because when I put all of the points in it made a rectangle

Anchor Annotation, Paper 4

Score Point 1

This response receives partial credit. It includes one of the two required elements.

- The correct location of point N (-1, -4) is provided.

An invalid justification is provided to show that quadrilateral KLMN is a rectangle. Simply stating that it made a rectangle is not a mathematical justification using the given coordinates of the rectangle.

To find point N such that KLMN is a rectangle, I first determined the slope of the line passing through points K and L. The slope of the line passing through points K and L is $-\frac{1}{3}$. A rectangle is the shape made when 4 lines intersect perpendicularly, which means that the angle between them is 90 degrees, or $\frac{\pi}{2}$ radians. This would mean that for KLMN to be a rectangle, the slope of the line passing through points L and M must be the negative reciprocal of the slope of the line passing through points K and L. Therefore, we arrive at the conclusion that the slope of the line passing through points L and M must be 3. According to the properties of a rectangle, this means that the slope of the line passing through points K and N is 3 and the slope of the line passing through points N and M is $-\frac{1}{3}$. To find the coordinates of point N, we can find the equation for the line passing through N and M and the line passing through K and N since we have the slopes for both of the lines and an additional point we can use. The intersection point of these lines is the coordinate of N. The coordinate of N is found to be $(-1.4, -5.2)$.

Anchor Annotation, Paper 5

Score Point 1

This response receives partial credit. It includes one of the two required elements.

- A valid justification is provided to show that quadrilateral KLMN is a rectangle. The response correctly finds the slopes of the given sides (*slope of the line passing through points K and L is $-1/3$, the slope of the line passing through Points L and M must be 3*) and identifies them as negative reciprocals, demonstrating that the quadrilateral is a rectangle. It also correctly explains how to determine the coordinates of point N (*we can find the equation for the line passing through N and M and the line passing through K and N... the intersection point of these lines is the coordinate N*).

An incorrect location of point N $(-1.4, -5.2)$ is provided.

$(-1, -4)$ are the coordinates of N, find the distance between points K and L then find what point has the same distance between it and point M. To check this find the distance between points L and M and make sure this point has the same distance between it and point K.

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

This response receives partial credit. It includes one of the two required elements.

- The correct location of point N $(-1, -4)$ is provided.

The justification provided is incomplete and does not earn credit. Although the distances do need to be equal, exactly how that is done is left unstated. Additionally, it is unclear what other properties of rectangles are being used to find the point.

For KLMN to be a rectangle, N has to be at $(-1, -4)$. The slope between K and L is $-\frac{1}{3}$ and the slope between M and L is 3. In order for KLMN to be a rectangle, the slope between N and M has to be the same as the slope between K and L $(-\frac{1}{3})$ and the slope between N and K has to be the same as the slope between M and L (3). The coordinate point $(-1, -4)$ does both of these.

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

This response receives full credit. It includes each of the two required elements.

- The correct location of point N $(-1, -4)$ is provided.
- A valid justification is provided to show that quadrilateral KLMN is a rectangle. The response correctly states that opposite sides must have the same slope and uses the slopes of KL and ML $(-1/3 \text{ and } 3, \text{ respectively})$ as the slopes of NM and NK. The response then states that the point $(-1, -4)$ makes both statements true. Although the response does not show the work, it demonstrates a solid understanding of geometry and clearly identifies the rectangle properties used to justify the answer.

$(-1, -4)$

This is found by finding the slope of line LM, which is 3, and setting that as the slope of NK. Then, using this slope, you can find the equation for line NK, being $3x - 1$. Then, find the slope of KL, being $-\frac{1}{3}$, and set that as the slope of NM. Next, the equation for this line is $-\frac{1}{3}x - \frac{13}{3}$. The slopes of opposite lines of a rectangle must be equal, which is why they are set equal to each other. Then, the equations for these lines are set equal to each other, solving for an x -value of -1. Finally, plug the x -value of -1 into one of the equations to get -4.

Anchor Annotation, Paper 8

Score Point 2

This response receives full credit. It includes each of the two required elements.

- The correct location of point N $(-1, -4)$ is provided.
- A valid justification is provided to show that quadrilateral KLMN is a rectangle. The response correctly calculates the slopes of the sides LM (*which is 3*) and KL (*being $-\frac{1}{3}$*) and uses them to determine the equations of the lines containing the opposite sides. A correct description of the process is included (*The slopes of opposite lines of a rectangle must be equal, which is why they are set equal to each other*). After finding these lines and calculating their intersection point, the missing point N is determined.

Point N: $(-1, -4)$

A rectangle has two sets of congruent sides. $\overline{KL}$ had a length of $\sqrt{10}$. $\overline{LM}$ had a length of $2\sqrt{10}$. $\overline{NM}$ has a length of $\sqrt{10}$. $\overline{KN}$ a length of $2\sqrt{10}$.

A rectangle has two perpendicular slopes. This means that they are opposite and reciporcal. The slope from K to L was $-\frac{1}{3}$. The slope from L to M was 3. Using these slopes you can form the equations, $y = 3x - 1$ and $y = -\frac{1}{3}x - \frac{13}{3}$. Using these equations, you find the intercept, which would be point N.

Anchor Annotation, Paper 9

Score Point 2

This response receives full credit. It includes each of the two required elements.

- The correct location of point N $(-1, -4)$ is provided.
- A valid justification is provided to show that quadrilateral KLMN is a rectangle. The response makes several correct statements about the slopes of the sides of the triangle (*a rectangle has two perpendicular slopes...they are opposite reciprocal...the slope from K to L was $-1/3$. The slope from L to M was 3*) and uses them to set up equations for the lines containing the two missing sides, KN and NM. Although the lines are not explicitly solved, the response provides sufficient explanation to earn credit.



7

MA1021146_RE

A student makes glass sculptures. He compared the weight of the sculptures with the cost to make them. He created the linear model $y = 2x + 1$, which can be used to predict the cost to make a sculpture, in dollars, based on the weight of the sculpture, x , in pounds. Complete the statement about the predictions that can be made using the equation.

Select from the drop-down menus to correctly complete the statement.

For each additional , the predicted increases by .

RESPONSE_A1	RESPONSE_A2	RESPONSE_A3
dollar	cost	1 dollar
		1 pound
pound	weight	2 dollars
		2 pounds

CORRECT ANSWER

RESPONSE_A1 = pound

RESPONSE_A2 = cost

RESPONSE_A3 = 2 dollars



Released Item Performance

Kentucky Summative Assessments

Spring 2026
Grade 10
Mathematics

Item: MA1021146*

Book Question Number: 7

Standard: KY.HS.SP.7

Item Type: TE

Key: see below

Student Group	Number of Students	Percent Correct	Average Item Score	Item Breakout Statistics - Score Percentages	
				Score 0 (%)	Score 1 (%)
All Students	24,746	36.4%	0.36	64%	36%
Gender					
Female	12,222	34.3%	0.34	66%	34%
Male	12,524	38.4%	0.38	62%	38%
Ethnicity					
African American	2,696	22.2%	0.22	78%	22%
American Indian or Alaska Native	35	31.4%	0.31	69%	31%
Asian	547	53.0%	0.53	47%	53%
Hispanic or Latino	2,522	27.0%	0.27	73%	27%
Native Hawaiian or Pacific Islander	49	28.6%	0.29	71%	29%
White (non-Hispanic)	17,587	39.6%	0.40	60%	40%
Two or more races	1,309	34.2%	0.34	66%	34%
Migrant					
Migrant	72	22.2%	0.22	78%	22%
English Learner					
English Learner	1,222	14.0%	0.14	86%	14%
Economically Disadvantaged					
Economically Disadvantaged	13,435	30.2%	0.30	70%	30%
Students with Disabilities					
Students with Disabilities	1,351	20.8%	0.21	79%	21%

Key: Drop Down 1: should be pound. Drop Down 2: should be cost. Drop Down 3: should be 2 dollars.

* Calculator section



8

MA1020082_1

A researcher studied the relationship between hourly wages and years of working experience for workers at local businesses. The researcher used the hourly wages and years of experience of 25 randomly sampled workers to create the equation $y = 1.52x + 12.70$, where x represents years of experience and y represents a predicted hourly wage. What does the value 12.70 represent?

- A** The predicted hourly wage of a worker with no experience.
- B** The predicted average hourly wage of all the workers in the study.
- C** The predicted hourly wage of a worker with about 1.5 years of experience.
- D** The predicted hourly wage increase of a worker for each year of experience.



Released Item Performance

Kentucky Summative Assessments

Spring 2026
Grade 10
Mathematics

Item: MA1020082*

Book Question Number: 8

Standard: KY.HS.SP.7

Item Type: MC

Key: A

Student Group	Number of Students	Percent Correct	Average Item Score	Item Breakout Statistics - Answer Choice Options			
				A (%)	B (%)	C (%)	D (%)
All Students	24,770	29%	0.29	29%	24%	30%	17%
Gender							
Female	12,234	26%	0.26	26%	25%	30%	20%
Male	12,536	33%	0.33	33%	22%	30%	14%
Ethnicity							
African American	2,712	22%	0.22	22%	24%	36%	18%
American Indian or Alaska Native	35	31%	0.31	31%	17%	34%	17%
Asian	549	42%	0.42	42%	23%	19%	15%
Hispanic or Latino	2,521	22%	0.22	22%	26%	32%	19%
Native Hawaiian or Pacific Islander	49	22%	0.22	22%	33%	29%	16%
White (non-Hispanic)	17,595	31%	0.31	31%	23%	29%	17%
Two or more races	1,308	26%	0.26	26%	24%	32%	17%
Migrant							
Migrant	72	18%	0.18	18%	38%	24%	21%
English Learner							
English Learner	1,224	15%	0.15	15%	26%	37%	22%
Economically Disadvantaged							
Economically Disadvantaged	13,455	24%	0.24	24%	24%	33%	18%
Students with Disabilities							
Students with Disabilities	1,353	20%	0.20	20%	25%	36%	19%

* Calculator section



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