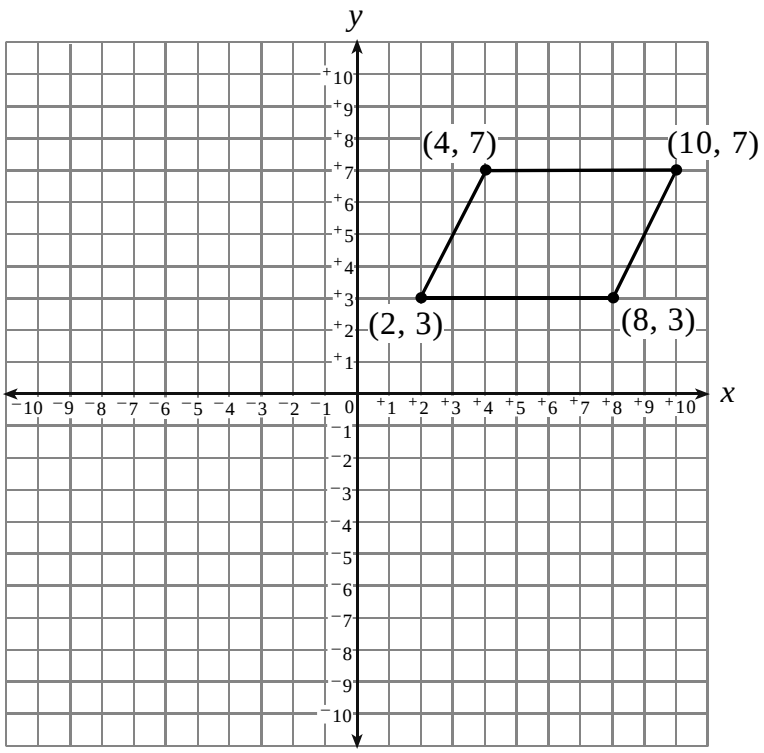
1. Which matrix contains the coordinates of the parallelogram shown below?



A $\begin{bmatrix} 2 & 3 & 3 & 4 \\ 7 & 7 & 8 & 10 \end{bmatrix}$

B $\begin{bmatrix} 2 & 4 & 10 & 8 \\ 7 & 3 & 3 & 7 \end{bmatrix}$

C $\begin{bmatrix} 2 & 4 & 7 & 3 \\ 3 & 7 & 10 & 8 \end{bmatrix}$

D $\begin{bmatrix} 2 & 4 & 10 & 8 \\ 3 & 7 & 7 & 3 \end{bmatrix}$

2. The Baltic Sea covers 147,500 square miles of area and has an average depth of 180 feet. The North Sea covers 164,900 square miles of area and has an average depth of 308 feet. The Red Sea has an area of 174,900 square miles and has an average depth of 1,764 feet. The East China Sea has an area of 256,600 square miles and an average depth of 620 feet. Which matrix displays this information organized by area and depth of each sea?

A $\begin{bmatrix} 147{,}500 & 164{,}900 & 174{,}900 & 256{,}600 \\ 180 & 308 & 620 & 1{,}764 \end{bmatrix}$

B $\begin{bmatrix} 147{,}500 & 180 & 164{,}900 & 308 \\ 174{,}900 & 1{,}764 & 256{,}600 & 620 \end{bmatrix}$

C $\begin{bmatrix} 147{,}500 & 164{,}900 & 174{,}900 & 256{,}600 \\ 180 & 308 & 1{,}764 & 620 \end{bmatrix}$

D $\begin{bmatrix} 147{,}500 & 164{,}900 & 174{,}900 & 256{,}600 \\ 180 & 620 & 308 & 1{,}764 \end{bmatrix}$

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3. This matrix shows the cost of cell phone service offered by several different companies.

	Monthly Cost for 200 Minutes	**Cost of Each Minute over 200 Minutes**
Company 1	\$39.00	\$0.05
Company 2	\$27.00	\$0.08
Company 3	\$42.00	\$0.04
Company 4	\$30.00	\$0.06

What is the cost of 320 minutes with Company 4?

A \$37.20

B \$45.00

C \$49.20

D \$75.00

4. On Tuesday, a store sold 12 compact discs, 5 cassettes, and 9 videos. On Wednesday, the store sold 19 compact discs, 3 cassettes, 9 videos, and 35 concert tickets. Which matrix shows the number of items sold, organized by day and product?

A $\begin{bmatrix} 12 & 9 & 5 \\ 19 & 3 & 9 \end{bmatrix}$

B $\begin{bmatrix} 12 & 5 & 9 \\ 19 & 3 & 35 \end{bmatrix}$

C $\begin{bmatrix} 12 & 5 & 9 & 0 \\ 19 & 3 & 9 & 35 \end{bmatrix}$

D $\begin{bmatrix} 12 & 9 & 19 & 9 \\ 5 & 0 & 3 & 35 \end{bmatrix}$

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5. The matrix below shows the cost of a school lunch at four schools over a four-year period.

	Year 1	**Year 2**	**Year 3**	**Year 4**
School 1	1.50	1.50	1.60	1.75
School 2	1.45	1.46	1.50	1.72
School 3	1.40	1.60	1.60	1.62
School 4	1.40	1.42	1.45	1.65

Which school had the greatest increase in the cost of a school lunch over the four-year period?

A School 1

B School 2

C School 3

D School 4

6. The matrix below displays the average SAT scores of eleventh- and twelfth-grade students over a three-year period at a high school.

Carter High School
Average SAT Scores

	1998	1999	2000
Grade 11	976	1,035	1,100
Grade 12	1,028	1,164	1,253

What was the change in average SAT scores of the twelfth-graders from 1998 to 2000?

A Scores increased by 225 points.

B Scores increased by 89 points.

C Scores decreased by 225 points.

D Scores decreased by 89 points.

7. A survey was done asking students what type of athletic shoes they wear and which type they would buy the next time they bought shoes. The results are shown in the chart below.

Type of Shoe Worn	**Type of Shoe Students Would Buy**
Tennis Shoes (**T**)	40% Tennis Shoes (**T**) 25% Running Shoes (**R**) 35% Basketball Shoes (**B**)
Running Shoes (**R**)	60% Running Shoes (**R**) 15% Tennis Shoes (**T**) 25% Basketball Shoes (**B**)

Which matrix represents these data?

A

	T	**B**	**R**
T	40%	35%	25%
R	15%	25%	60%

B

	T	**B**	**R**
T	40%	25%	35%
R	60%	15%	25%

C

	T	**R**
T	40%	60%
B	25%	15%
R	35%	25%

D

	T	**R**
T	40%	25%
B	35%	60%
R	15%	25%

8. Matrices P and Q are shown below.

$$P = \begin{bmatrix} 3 & 2 \\ 6 & 9 \\ 1 & 0 \end{bmatrix} \qquad Q = \begin{bmatrix} -3 & -7 \\ -2 & -6 \\ 4 & 0 \end{bmatrix}$$

What is $P - Q$?

A $\begin{bmatrix} -6 & -9 \\ -8 & -15 \\ 3 & 0 \end{bmatrix}$

B $\begin{bmatrix} 0 & -5 \\ 4 & 3 \\ 5 & 0 \end{bmatrix}$

C $\begin{bmatrix} 0 & 5 \\ -4 & -3 \\ -5 & 0 \end{bmatrix}$

D $\begin{bmatrix} 6 & 9 \\ 8 & 15 \\ -3 & 0 \end{bmatrix}$

9. Given the matrices:

$$J = \begin{bmatrix} 26 & 18 \\ 34 & 19 \\ 61 & 23 \end{bmatrix} \text{ and } K = \begin{bmatrix} 43 & 21 \\ 26 & 20 \\ 33 & 92 \end{bmatrix}$$

What is $4J - 2K$?

A $\begin{bmatrix} -120 & -48 \\ -36 & -42 \\ -10 & -322 \end{bmatrix}$

B $\begin{bmatrix} 18 & 30 \\ 84 & 36 \\ 178 & -92 \end{bmatrix}$

C $\begin{bmatrix} 120 & 48 \\ 36 & 42 \\ 10 & 322 \end{bmatrix}$

D $\begin{bmatrix} -17 & -3 \\ 8 & -1 \\ 28 & -69 \end{bmatrix}$

10. Given the matrices:

$$E = \begin{bmatrix} 3 & 2 & 1 \\ 7 & -2 & -3 \end{bmatrix} \qquad F = \begin{bmatrix} 5 & -4 & 0 \\ 2 & -6 & 1 \end{bmatrix}$$

What is $3E - F$?

A $\begin{bmatrix} 4 & 10 & 3 \\ 19 & 0 & -10 \end{bmatrix}$

B $\begin{bmatrix} -6 & 18 & 3 \\ 15 & 12 & -12 \end{bmatrix}$

C $\begin{bmatrix} 4 & 2 & 0 \\ 19 & -12 & -8 \end{bmatrix}$

D $\begin{bmatrix} -2 & 6 & 1 \\ 5 & 4 & -4 \end{bmatrix}$

11. Given:

$$J = \begin{bmatrix} 1 & -2 \\ 0 & -2 \\ 6 & -1 \\ 5 & 9 \end{bmatrix}, K = \begin{bmatrix} 5 & 1 \\ 0 & 5 \\ 8 & 0 \\ -8 & 1 \end{bmatrix}, \text{ and } L = \begin{bmatrix} -4 & 3 \\ 9 & 1 \\ 4 & -7 \\ 3 & 4 \end{bmatrix}$$

What is $J + K - L$?

A $\begin{bmatrix} -8 & 0 \\ 9 & -6 \\ 2 & -8 \\ 16 & 12 \end{bmatrix}$

B $\begin{bmatrix} 0 & -6 \\ -9 & -8 \\ -6 & 6 \\ 10 & 4 \end{bmatrix}$

C $\begin{bmatrix} 2 & -2 \\ 9 & 4 \\ 18 & -8 \\ 0 & 14 \end{bmatrix}$

D $\begin{bmatrix} 10 & -4 \\ -9 & 2 \\ 10 & 6 \\ -6 & 6 \end{bmatrix}$

12. What is $4\begin{bmatrix} 2 & 3 \\ 3 & 4 \end{bmatrix} - 3\begin{bmatrix} -2 & 6 \\ 3 & 7 \end{bmatrix}$?

A $\begin{bmatrix} 0 & 9 \\ 6 & 11 \end{bmatrix}$

B $\begin{bmatrix} 2 & -6 \\ 3 & -5 \end{bmatrix}$

C $\begin{bmatrix} 12 & 30 \\ 21 & 37 \end{bmatrix}$

D $\begin{bmatrix} 14 & -6 \\ 3 & -5 \end{bmatrix}$

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13. Nagel's Bagel Shop makes a monthly report to summarize the cost of making a single bagel of each type and the price at which it is sold. Matrix *C* represents cost, and matrix *S* represents selling price.

$$C = \begin{matrix} \text{Plain} & \text{Blueberry} & \text{Wheat} & \text{Onion} \end{matrix}\begin{bmatrix} 0.12 & 0.17 & 0.13 & 0.15 \end{bmatrix} \qquad S = \begin{matrix} \text{Plain} & \text{Blueberry} & \text{Wheat} & \text{Onion} \end{matrix}\begin{bmatrix} 0.45 & 0.50 & 0.50 & 0.50 \end{bmatrix}$$

Which matrix represents the profit on the sale of a single bagel of each type?
(Profit = Selling Price – Cost)

A
$$\begin{matrix} \text{Plain} & \text{Blueberry} & \text{Wheat} & \text{Onion} \end{matrix}\begin{bmatrix} 0.57 & 0.67 & 0.63 & 0.65 \end{bmatrix}$$

B
$$\begin{matrix} \text{Plain} & \text{Blueberry} & \text{Wheat} & \text{Onion} \end{matrix}\begin{bmatrix} 0.33 & 0.33 & 0.35 & 0.37 \end{bmatrix}$$

C
$$\begin{matrix} \text{Plain} & \text{Blueberry} & \text{Wheat} & \text{Onion} \end{matrix}\begin{bmatrix} 0.33 & 0.33 & 0.33 & 0.33 \end{bmatrix}$$

D
$$\begin{matrix} \text{Plain} & \text{Blueberry} & \text{Wheat} & \text{Onion} \end{matrix}\begin{bmatrix} 0.33 & 0.33 & 0.37 & 0.35 \end{bmatrix}$$

14. The table shows the relationship between calories and fat grams contained in orders of fried chicken from various restaurants.

Calories	305	410	320	500	510	440
Fat Grams	28	34	28	41	42	38

Assuming the data can best be described by a linear model, how many fat grams would be expected to be contained in a 275-calorie order of fried chicken?

A 28

B 27

C 25

D 22

15. The equation $y = 0.117x + 39{,}905$ models the relationship where x is the total population of a state, and y is the number of people aged 65 years or older in a state. Suppose the difference in total population between two states is one million. According to the equation, what is the expected difference in the number of people aged 65 or older?

A 39,905

B 117,000

C 0.117 (39,905)

D 39,905 ÷ 0.117

16. Five students in Miss Brown's algebra class reported the number of hours that they studied for a test. The number of hours and their test scores are in the table below.

Hours of Study	Test Score
2	86
2.5	80
3	85
4.5	90
5	96

According to a line of best fit for the data, what is the predicted test score of a student who studied 1 hour for the test?

A 75

B 78

C 81

D 84

17. The Smiths' average monthly electric bills in the years 1998 to 2005 are displayed in the table below.

Year	1998	1999	2000	2001	2002	2003	2004	2005
Average Monthly Bill	$102	$102	$104	$108	$116	$116	$121	$129

According to a line of best fit for the data, ***approximately*** how much per month would the Smiths pay in 2007?

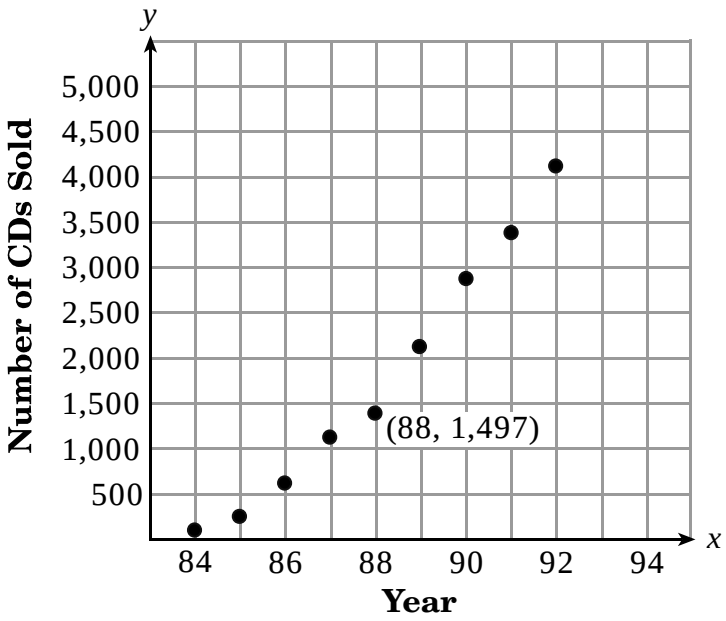
A $134

B $137

C $142

D $145

18. The graph shows a scatterplot of the number of compact discs (CDs) sold at a music store during part of the 1980s and early 1990s. An equation for the line of best fit for the given data is $y = 518x - 43{,}886$.



What is the difference between the observed value and the predicted value at $x = 88$?

A 1,698

B 979

C 518

D 201

19. The chart below shows cell phone use for seven years.

Year	**Number of Cell Phone Minutes** (billions)
1999	156
2000	264
2001	401
2002	549
2003	705
2004	857
2005	1,000

According to the line of best fit for the data, what is the ***approximate*** average annual increase in cell phone minutes for 1999–2005?

A 108 billion minutes

B 121 billion minutes

C 141 billion minutes

D 144 billion minutes

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20. The table below shows the price of rings for various weights of gemstones.

Weight (x)	0.17	0.25	0.28	0.35	0.32
Price (y)	$355	$642	$823	$1,086	$919

Which statement ***best*** interprets the meaning of the y-intercept of the linear function that best fits these data?

A the price of the ring per unit of weight of the gemstone

B the weight of the gemstone per dollar

C the cost of the ring with no gemstone

D the weight of the gemstone in the ring that costs $0

21. The table below shows the number of doctors in Bingham City from 1960 to 1986.

Year (x)	1960	1967	1970	1975	1982	1985	1986
Number of Doctors (y)	2,937	3,511	3,754	4,173	4,741	5,019	5,102

If a linear regression model is fit to this data, which equation would ***best*** represent the data? (let x = the number of years after 1960)

A $y = 1.01x - 3{,}500$

B $y = 82x + 2{,}937$

C $y = 83x + 2{,}929$

D $y = 83x + 2{,}944$

End of Goal 3 Sample Items

EOC Algebra 1 Goal 3
Sample Items Key Report

1 **Objective:** **3.01**
Use matrices to display and interpret data.
Thinking Skill: Organizing **Correct Answer:** D

2 **Objective:** **3.01**
Use matrices to display and interpret data.
Thinking Skill: Organizing **Correct Answer:** C

3 **Objective:** **3.01**
Use matrices to display and interpret data.
Thinking Skill: Analyzing **Correct Answer:** A

4 **Objective:** **3.01**
Use matrices to display and interpret data.
Thinking Skill: Organizing **Correct Answer:** C

5 **Objective:** **3.01**
Use matrices to display and interpret data.
Thinking Skill: Applying **Correct Answer:** B

6 **Objective:** **3.01**
Use matrices to display and interpret data.
Thinking Skill: Applying **Correct Answer:** A

7 **Objective:** **3.01**
Use matrices to display and interpret data.
Thinking Skill: Organizing **Correct Answer:** A

8 **Objective:** **3.02**
Operate (addition, subtraction, scalar multiplication) with matrices to solve problems.
Thinking Skill: Applying **Correct Answer:** D

9 **Objective:** **3.02**
Operate (addition, subtraction, scalar multiplication) with matrices to solve problems.
Thinking Skill: Applying **Correct Answer:** B

10 **Objective:** **3.02**
Operate (addition, subtraction, scalar multiplication) with matrices to solve problems.
Thinking Skill: Applying **Correct Answer:** A

11 **Objective: 3.02**
Operate (addition, subtraction, scalar multiplication) with matrices to solve problems.
Thinking Skill: Applying **Correct Answer:** D

12 **Objective: 3.02**
Operate (addition, subtraction, scalar multiplication) with matrices to solve problems.
Thinking Skill: Applying **Correct Answer:** D

13 **Objective: 3.02**
Operate (addition, subtraction, scalar multiplication) with matrices to solve problems.
Thinking Skill: Applying **Correct Answer:** D

14 **Objective: 3.03**
Create linear models for sets of data to solve problems. a) Interpret constants and coefficients in the context of the data. b) Check the model for goodness-of-fit and use the model, where appropriate, to draw conclusions or make predictions.
Thinking Skill: Analyzing **Correct Answer:** C

15 **Objective: 3.03**
Create linear models for sets of data to solve problems. a) Interpret constants and coefficients in the context of the data. b) Check the model for goodness-of-fit and use the model, where appropriate, to draw conclusions or make predictions.
Thinking Skill: Analyzing **Correct Answer:** B

16 **Objective: 3.03**
Create linear models for sets of data to solve problems. a) Interpret constants and coefficients in the context of the data. b) Check the model for goodness-of-fit and use the model, where appropriate, to draw conclusions or make predictions.
Thinking Skill: Analyzing **Correct Answer:** B

17 **Objective: 3.03**
Create linear models for sets of data to solve problems. a) Interpret constants and coefficients in the context of the data. b) Check the model for goodness-of-fit and use the model, where appropriate, to draw conclusions or make predictions.
Thinking Skill: Analyzing **Correct Answer:** A

18 **Objective: 3.03**
Create linear models for sets of data to solve problems. a) Interpret constants and coefficients in the context of the data. b) Check the model for goodness-of-fit and use the model, where appropriate, to draw conclusions or make predictions.
Thinking Skill: Analyzing **Correct Answer:** D

19 **Objective: 3.03**
Create linear models for sets of data to solve problems. a) Interpret constants and coefficients in the context of the data. b) Check the model for goodness-of-fit and use the model, where appropriate, to draw conclusions or make predictions.
Thinking Skill: Analyzing **Correct Answer:** D

20 **Objective: 3.03**
Create linear models for sets of data to solve problems. a) Interpret constants and coefficients in the context of the data. b) Check the model for goodness-of-fit and use the model, where appropriate, to draw conclusions or make predictions.
Thinking Skill: Analyzing **Correct Answer:** C

21 **Objective: 3.03**
Create linear models for sets of data to solve problems. a) Interpret constants and coefficients in the context of the data. b) Check the model for goodness-of-fit and use the model, where appropriate, to draw conclusions or make predictions.
Thinking Skill: Applying **Correct Answer:** C