A*C*TAAP

Arkansas Comprehensive Testing, Assessment, and Accountability Program

Released Item Booklet

Algebra I
End-of-Course Examination
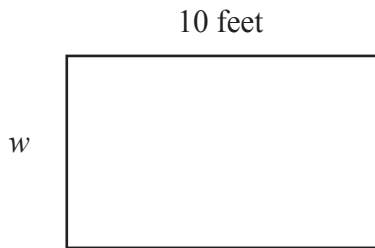
April 2006 Administration

Arkansas Department of Education

1. Simplify:

$$3(20 \bullet 8 + 15 \bullet 14 - 10) \div 2$$

A.   330

B.   340

* C.   540

D.   685

Use the figure below to answer question 2.

10 feet

w

Perimeter = 29 feet

(Not drawn to scale.)

2. A plan for a rectangular garden includes fencing around the perimeter. The length of the garden must be 10 feet in order to fit on the proposed site. There are 29 feet of fencing available. How wide can the garden be?

A. $w > 4.5$ feet

* B. $w \leq 4.5$ feet

C. $w > 9$ feet

D. $w \leq 9$ feet

3. Tyrone was given 4 pieces of wood with the following lengths:

$2\dfrac{3}{4}$ feet   2.9 feet $\sqrt{8}$ feet $2\dfrac{5}{9}$ feet

Which lists the pieces of wood from shortest to longest?

A. $2\dfrac{5}{9}$ feet, $2\dfrac{3}{4}$ feet, 2.9 feet, $\sqrt{8}$ feet

B. $2\dfrac{3}{4}$ feet, $2\dfrac{5}{9}$ feet, $\sqrt{8}$ feet, 2.9 feet

C. $2\dfrac{5}{9}$ feet, $\sqrt{8}$ feet, $2\dfrac{3}{4}$ feet, 2.9 feet

* D. $2\dfrac{5}{9}$ feet, $2\dfrac{3}{4}$ feet, $\sqrt{8}$ feet, 2.9 feet

4. During the year 2000, Americans spent 6.6×10^9 dollars on ice cream. The U.S. population that year was 2.8×10^8. Approximately what was the average amount spent on ice cream per American during the year 2000?

* A. $24

B. $38

C. $42

D. $94

Use the matrices below to answer question 5.

MANUFACTURING

	Car	Light Truck	Commercial Truck
Economy	90	70	60
Standard	60	50	42
Super	30	25	20

SALES

	Car	Light Truck	Commercial Truck
Economy	41	38	36
Standard	25	24	19
Super	15	17	16

5. A manufacturing plant makes economy, standard, and super grade tires for cars, light trucks, and commercial trucks. The matrices above show manufacturing output and sales. Which matrix represents the difference between the 2 matrices?

A.

	Car	Light Truck	Commercial Truck
Economy	131	108	96
Standard	85	74	61
Super	45	42	36

B.

	Car	Light Truck	Commercial Truck
Economy	49	31	14
Standard	36	26	17
Super	25	14	4

* C.

	Car	Light Truck	Commercial Truck
Economy	49	32	24
Standard	35	26	23
Super	15	8	4

D.

	Car	Light Truck	Commercial Truck
Economy	49	45	45
Standard	22	26	25
Super	6	6	4

6. The supply of tomatoes at Latisha's Supermarket for the past 12 months is represented in the expression below, where t is the month from 1 to 12.

Supply: $6t^2 + 7t + 2$

Which shows this expression completely factored?

* A. $(3t + 2)(2t + 1)$

B. $2(3t + 1)(t + 1)$

C. $(6t + 2)(t + 1)$

D. $(6t + 1)(t + 2)$

7. Which situation would require finding the product?

A.   finding the distance between the highest (2,753 feet) and lowest (55 feet) points in Arkansas

B.   finding the number of 225 mL cups filled by a 2,000 mL bottle of water

C.   finding the total cost of a restaurant bill of $22.50 and a $3.75 tip

* D.   finding the total cost of 6 tickets at $5.00 each for a movie matinee

8. Simplify:

$$2(2 \bullet 4 + 3)^2 + \frac{24 - 4}{8 - 4}$$

    A.   245

    * B.   247

    C.   395

    D.   397

Use the inequality below to answer question 9.

$$\frac{123 + 108 + x}{3} \geq 115$$

9. Jamie bowled scores of 123 and 108 on his first 2 games. What score (x) does Jamie need to bowl on his third game to have an average of at least 115?

    A.   38

    B.   102

    * C.   114

    D.   116

10. What is the domain of

    $f = \{(0, 8)\ (-1, 5)\ (5, 2)\ (4, 2)\ (-7, 0)\}$?

    A. $\{0, 2, 5, 8\}$

    B. $\{0, 5\}$

    C. $\{-7, -1, 0, 2, 4, 5, 8\}$

    * D. $\{-7, -1, 0, 4, 5\}$

11. Completely factor:

$$16p^2 + 8p + 1$$

    A. $(4p)^2$

    B. $(8p)^2$

    * C. $(4p + 1)^2$

    D. $(8p + 1)^2$

12. Zak ate x bowls of cereal. Brenda ate 1 bowl less than Zak ate. Carlos ate 2 times the total bowls eaten by Zak and Brenda. What does $x - 1$ represent?

    A.   bowls of cereal Zak ate

    * B.   bowls of cereal Brenda ate

    C.   bowls of cereal Carlos ate

    D.   total bowls of cereal eaten

13. Suchi's job at the movie theater pays an hourly wage of $6.50. She will receive a $250 bonus if she works through the entire summer. The total amount Suchi will make for the entire summer can be modeled by the following equation:

$$y = 6.5x + 250$$

    Which represents the number of hours Suchi works?

    * A. x

    B. y

    C. $6.5x$

    D.   250

Use the table below to answer question 14.

Skating Arena Charges

Number of skaters	Total cost
4	$13.00
5	$16.25
7	$22.75
10	$32.50
12	$39.00

14. A skating arena employee recorded the number of skaters in each party and the total cost to skate. Using the table above, what is the total cost to skate for a party with 13 skaters?

   A. $35.50

   B. $40.00

 * C. $42.25

   D. $45.50

Use the figure below to answer question 15.

$3x + 2$

Joe's Garden

$3x - 1$
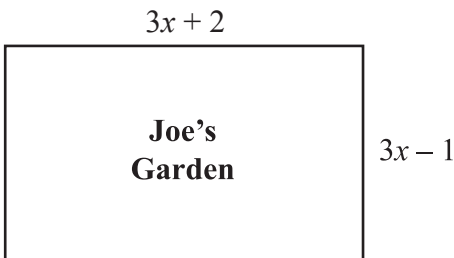
15. Joe's rectangular garden is shown above. In order to determine the area, he wrote $(3x + 2)(3x - 1)$. What is this expression in simplified form?

   A. $9x^2 - 2$

 * B. $9x^2 + 3x - 2$

   C. $9x^2 + 9x - 2$

   D. $10x$

16. The cost of a rental car at Penny's Auto Rentals is $0.30 per mile driven ($m$). Which function represents the cost of renting a car from Penny's?

   A. $f(m) = 0.30 + m$

 * B. $f(m) = 0.30m$

   C. $f(m) = \dfrac{m}{0.30}$

   D. $f(m) = \dfrac{m}{30}$

17. The ordered pairs represent the age of a husband and wife (husband's age, wife's age) for 4 different couples. Which relation is a function?

 * A. $\{(72, 68), (75, 76), (23, 22), (37, 31)\}$

   B. $\{(72, 70), (57, 60), (72, 69), (27, 24)\}$

   C. $\{(78, 73), (81, 80), (43, 39), (78, 76)\}$

   D. $\{(81, 84), (62, 62), (62, 58), (81, 76)\}$

18. Shelly needs to send a fax. At the coffee shop, the use of the fax machine is $2.00 plus $0.55 per page. At the library, the use of the fax machine is $0.80 per page. These costs (C) are shown in the equations below, where x is the number of pages to be faxed.

Coffee Shop: $C = 2.00 + 0.55x$
Library: $C = 0.80x$

For how many pages will the fax costs be the same at the coffee shop and the library?

   A.   2

   B.   3

   C.   6

 * D.   8

19. Teresa measured her bed. She found the length (L) of her bed was 6 feet shorter than twice the width (W). Which equation illustrates this relationship?

* A. $L = 2W - 6$

B. $L = 6W + 2$

C. $W = 2L - 6$

D. $W = 6L - 2$

Use the table below to answer question 20.

Lawyer's Fee Schedule

Hours Worked	Fee
1	$150
2	$300
3	$450
4	$600

20. A lawyer's fee per hour is shown in the table above. What is the range of this relation?

A.   {1, $600}

B.   {1, 4, $150, $600}

C.   {1, 2, 3, 4}

* D.   {$150, $300, $450, $600}

21. Simplify:

$$\frac{-12 + 4}{2} - 2(8 + 9 \bullet 2)$$

A.   −156

B.   −72

C.   −60

* D.   −56

22. Mrs. Jackson had a poster in her classroom. The poster was 24 inches wide and 36 inches tall. To make the poster fit in a smaller space, Mrs. Jackson removed x inches from the width and y inches from the height. Which is an expression for the area of the altered poster?

* A. $(24 - x)(36 - y)$

B. $(24 - y)(36 - x)$

C. $(x - 24)(y - 36)$

D. $(x - 36)(y - 24)$

23. Ben's mother entered his age and weight in his baby book as ordered pairs. This is the set of numbers he found in his baby book: {(8, 65), (10, 80), (12, 100), (14, 120), (16, 150)}. What is the domain of this set?

A.   {x: $8 \le x \le 16$}

* B.   {8, 10, 12, 14, 16}

C.   {y: $65 \le y \le 150$}

D.   {65, 80, 100, 120, 150}

24. Fred bought 10 DVDs (d dollars each) and 20 VCR tapes (v dollars each) at a local movie store. The total bill was $10d + 20v$. What is another way to write this expression?

A. $10(d2v)$

* B. $10(d + 2v)$

C. $(d + v)(10 + 20)$

D. $10(d + 20v)$

25. Completely factor:

$$18x^3 + 4x^2 - 2x$$

* A. $2x(9x^2 + 2x - 1)$

B. $3x(6x^2 + x - 1)$

C. $6x(3x^2 + 4x - 2)$

D. $9x(2x^2 + 4x - 2)$

26. Travis traveled 180 miles in 4 hours. He continued at the same rate. How many hours did it take him to travel a total of 576 miles?

A.   3.2

B.   8.8

* C.   12.8

D.   16.8

Use the table below to answer question 27.

Raft Rental Costs

Hours	Cost
2	$50
3	$68
4	$86
5	$104

27. The table above shows the cost of renting a raft from Ark River Trips. The pattern continues. What would be the cost to rent a raft for 7 hours?

A. $122

* B. $140

C. $148

D. $154

Use the inequality below to answer question 28.

$$\frac{5}{6}x + 3 > \frac{3}{2}x + 1$$

28. Which value of x makes the inequality above a true statement?

* A.   2

B.   3

C.   4

D.   6

29. Kiri received a set of 24 baseball cards as a gift. She plans to buy a packet of 6 new cards each week (x). When Kiri has more than 90 cards, she will need to buy a new album. What sentence represents this situation?

A. $6 + 24x < 90$

B. $6 + 24x > 90$

C. $24 + 6x < 90$

* D. $24 + 6x > 90$

30. A total of 550 people attended last year's community bake sale. They bought 132 dozen cookies. This year attendance is expected to increase by 75 people. Based on last year's rate, how many total dozen cookies will be bought this year?

A.   116

* B.   150

C.   207

D.   312

31. A candle loses 2 inches of height for every hour it is lit. Which graph represents the height of the candle with respect to time?

A.   *height*

time

B.   *height*

time

C.   *height*

time

* D.   *height*

time
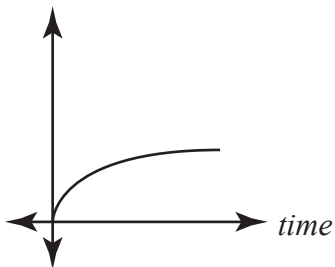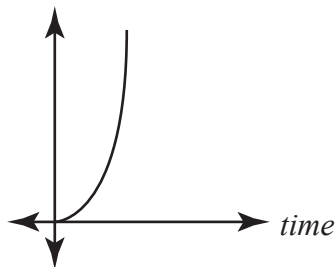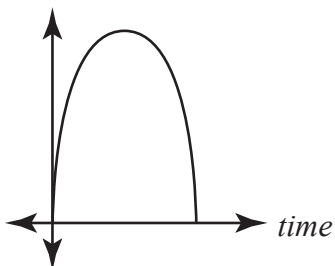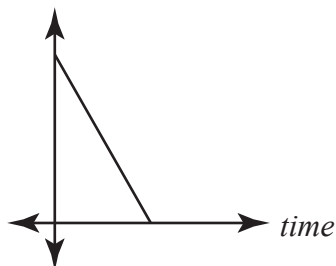
Use the figure below to answer question 32.

3*x* + 2

2*x* – 1
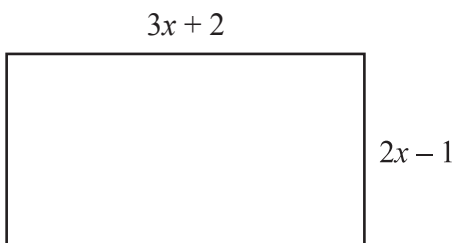
32. The perimeter of the rectangle above is 2(3*x* + 2) + 2(2*x* – 1). What is this expression in simplified form?

   A.   10*x* + 1

   B.   20*x* – 4

 * C.   10*x* + 2

   D.   12*x*

Use the matrix below to answer question 33.

Matrix A

$$\begin{bmatrix} 68 & 43 \\ 52 & 35 \end{bmatrix}$$

33. What is 2*A*?

   A. $\begin{bmatrix} 396 \end{bmatrix}$

   B. $\begin{bmatrix} 240 & 156 \end{bmatrix}$

   C. $\begin{bmatrix} 222 \\ 174 \end{bmatrix}$

 * D. $\begin{bmatrix} 136 & 86 \\ 104 & 70 \end{bmatrix}$

Use the graph below to answer question 34.
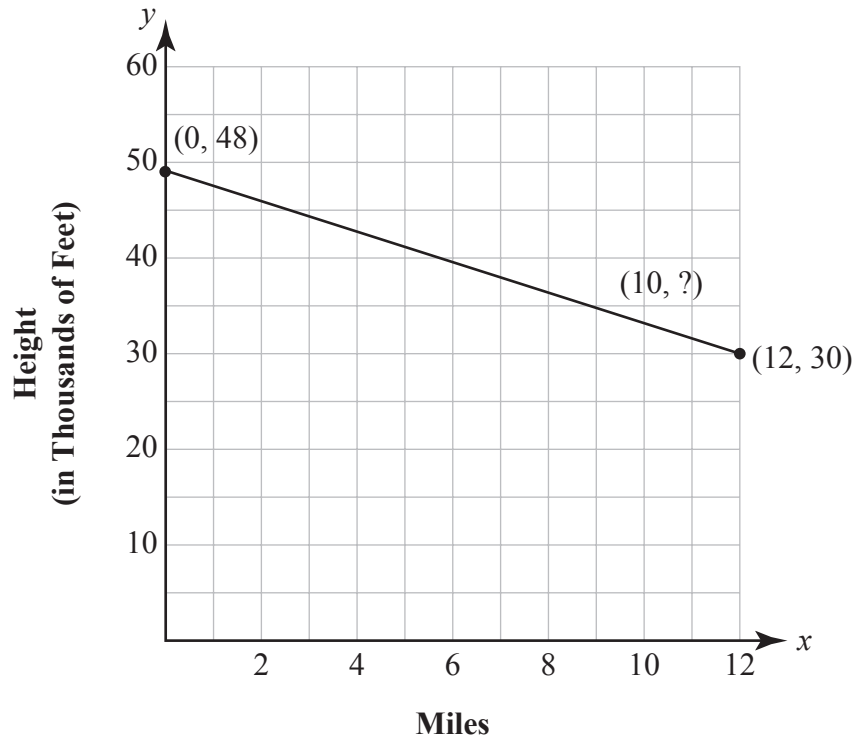
Miles

34. An airplane is flying at a height of 48,000 feet. The pilot must decrease the plane's height to 30,000 feet over the next 12 miles, at a uniform rate. What is the height of the plane at the 10-mile mark?

   A.   31,500 feet

  * B.   33,000 feet

   C.   39,000 feet

   D.   41,500 feet

---

35. Jenny has a job washing cars. She washes about 8 cars per hour. On Saturday, she washed 20 cars. On Sunday she worked h hours. Which equation gives the total number of cars washed (N) on Saturday and Sunday?

   A. $h = 8 + 20N$

   B. $h = 8N + 20$

   C. $N = 8 + 20h$

  * D. $N = 8h + 20$

36. The area of a region is given by the formula $A = 3s^2 + 7s + 4$. What is the independent variable?

  * A. s

   B. A

   C. s^2

   D. $7s$

37. Which shape represents a function?

* A.

B.

C.

D.
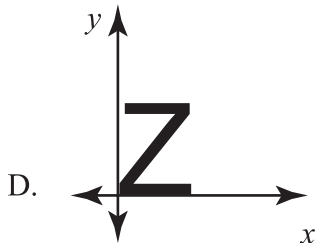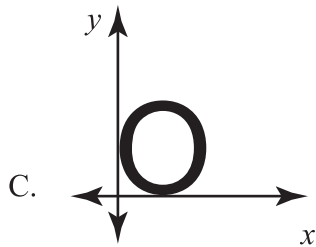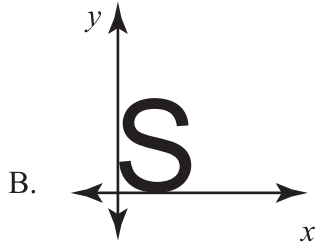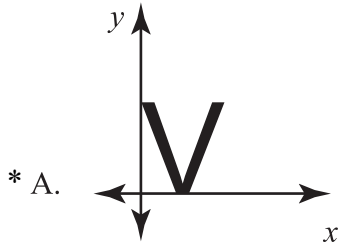
38. The volume of a cube is x^3. The volume of a rectangular box is $x^3 + 5x^2 + 6x$. What is the total volume of the cube and the box?

A. $5x^2 + 6x$

B. $x^3 + 6x^2 + 6x$

* C. $2x^3 + 5x^2 + 6x$

D. $x^6 + 5x^5 + 6x^4$

39. On Friday, Waylen bought a book on sale. During the sale, the book was $9 cheaper than 2 times the regular price (p). Which expression represents the sale price of the book?

A. $2 - 9p$

* B. $2p - 9$

C. $9 - 2p$

D. $9p + 2$

Use the diagram below to answer question 40.

7 ft.

4 ft.
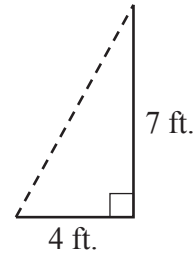
(Not drawn to scale.)

40. The diagram above shows the layout of the water pipes in Wayne's shed. He needs to replace the pipe shown by the dotted line. To the nearest tenth, how many feet of pipe does Wayne need to replace?

A.   3.0

B.   4.6

C.   5.7

* D.   8.1

41. Ben purchased some CDs at a local music store. Each CD cost $14, and he paid a total of $7 in tax. Which equation describes Ben's cost (C) for x CDs?

    A. $x = 7C + 14$

    B. $C = 7x + 14$

    C. $x = 14C + 7$

  * D. $C = 14x + 7$

42. Sam ordered a rectangular pizza that was 12 in. wide and 16 in. long. Sam ate $\frac{1}{4}$ of the pizza. What is the area of the pizza Sam ate?

    A. 14 in.^{2}

  * B. 48 in.^{2}

    C. 56 in.^{2}

    D. 192 in.^{2}

43. Which equation shows the total wages (w) earned by a worker who is paid $5.50 per hour for x hours?

    A. $w = 5.50 + x$

  * B. $w = 5.50x$

    C. $w + 5.50 = x$

    D. $5.50w = x$

Use the table below to answer question 44.

Tyler's Work Record

Day	Hours Worked
Thursday	5
Friday	7
Saturday	8
Sunday	5

44. The table above shows the number of hours Tyler worked each day. What is the domain of this relationship?

    A. $\{3\}$

    B. $\{5, 7, 8\}$

    C. $\{y: 5 \leq y \leq 8\}$

  * D.   {Thursday, Friday, Saturday, Sunday}

45. A single serving of Crunchy Flakes cereal provides 45% of the daily recommended amount of iron. The daily recommended amount of iron is 18 milligrams. How many milligrams of iron are in a single serving of Crunchy Flakes?

    A.   0.025

    B.   0.4

    C.   2.5

  * D.   8.1

Use the matrices below to answer question 46.

Amount Earned

Kari   Sam

Day 1 $\begin{bmatrix} 16 & 10 \\ 8 & 12 \end{bmatrix}$
Day 2

Amount Spent

Kari   Sam

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

46. The amounts Kari and Sam earned and spent for 2 days are shown in the matrices above. Which matrix represents the amount saved each day?

Kari   Sam

A.   **Day 1** $\begin{bmatrix} 11 & 6 \\ 2 & 8 \end{bmatrix}$
     Day 2

Kari   Sam

B.   **Day 1** $\begin{bmatrix} 12 & 6 \\ 3 & 6 \end{bmatrix}$
     Day 2

Kari   Sam

* C.   **Day 1** $\begin{bmatrix} 12 & 5 \\ 4 & 6 \end{bmatrix}$
     Day 2

Kari   Sam

D.   **Day 1** $\begin{bmatrix} 12 & 3 \\ 6 & 6 \end{bmatrix}$
     Day 2

47. Completely factor:

$$n^2 + n - 42$$

A. $(n - 2)(n + 21)$

B. $(n + 2)(n - 21)$

* C. $(n - 6)(n + 7)$

D. $(n + 6)(n - 7)$

48. The length of a rectangle is 4 inches. What equation shows how area (A) depends on width (w)?

* A. $A = 4w$

B. $4A = w$

C. $A = w^2$

D. $A = w + 4$

Use the figure below to answer question 49.

30 in.

30 in.
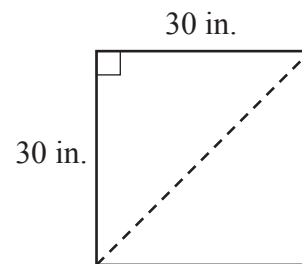
49. Using the Pythagorean Theorem, Terrel calculated the length of the diagonal shown above to be $30\sqrt{2}$ inches. Which is the **best** estimate of the length of the diagonal?

A.   31 inches

B.   35 inches

* C.   42 inches

D.   60 inches

Use the table below to answer question 50.

Jerry's Work Record

Monday	Tuesday	Wednesday	Thursday
7.5 hours	8 hours	8.25 hours	8 hours

50. Jerry works 5 days during the week. The table above shows the number of hours he worked for 4 days. He plans to work a total of 40 hours this week. Which algebraic sentence would Jerry use to find the number of hours he must work on Friday?

   A. $x - (7.5 + 8 + 8.25 + 8) = 40$

 * B. $7.5 + 8 + 8.25 + 8 + x = 40$

   C. $\dfrac{(7.5 + 8 + 8.25 + 8 + x)}{5} = 40$

   D. $\dfrac{(7.5 + 8 + 8.25 + 8)}{40} = x$

Use the table below to answer question 51.

Distance from Little Rock

City	Distance (miles)
England	25
Fayetteville	192
Fox	97
Guy	48
Harrison	139

51. Which city is about 4 times as far as Guy is from Little Rock?

   A.   England

 * B.   Fayetteville

   C.   Fox

   D.   Harrison

52. Stacy uses her car to deliver pizzas. She will stop to deliver 3 pizzas and then return to the restaurant. Which graph could model this situation?

A.   **Stacy's Distance from Restaurant**
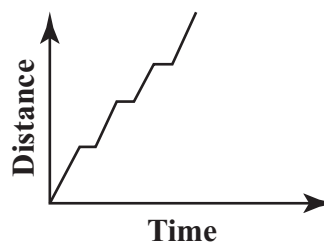
* B.   **Stacy's Distance from Restaurant**
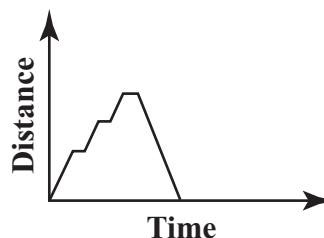
C.   **Stacy's Distance from Restaurant**
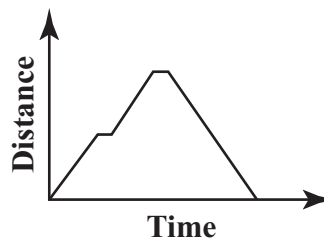
D.   **Stacy's Distance from Restaurant**
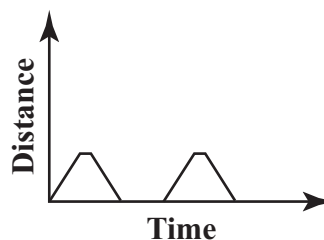
53. Factor:

$$x^2 - 8x - 33$$

    A. $8x(x - 33)$

    B. $(x + 2)(x - 4)$

  * C. $(x + 3)(x - 11)$

    D. $(x - 8)(x - 33)$

54. Which graph shows y as a function of x?

  A.

  B.

  C.

 * D.
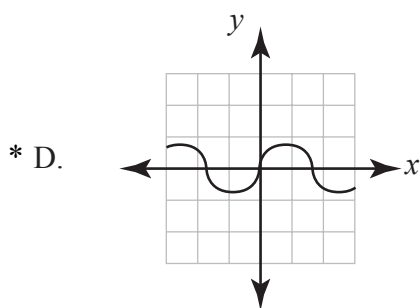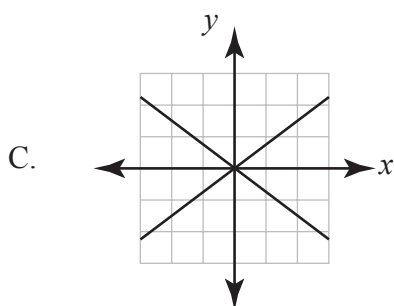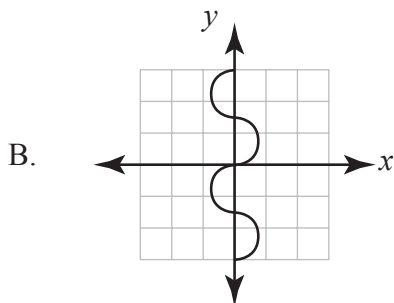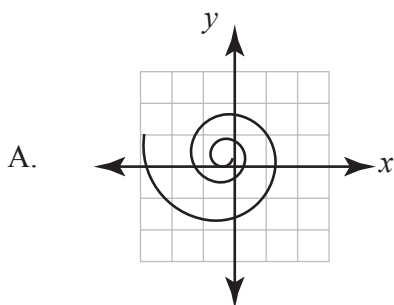
Use the figure below to answer question 55.

$4L + 2S$

$3L + 2S$

$4L$

$4L - S$

$5L + S$
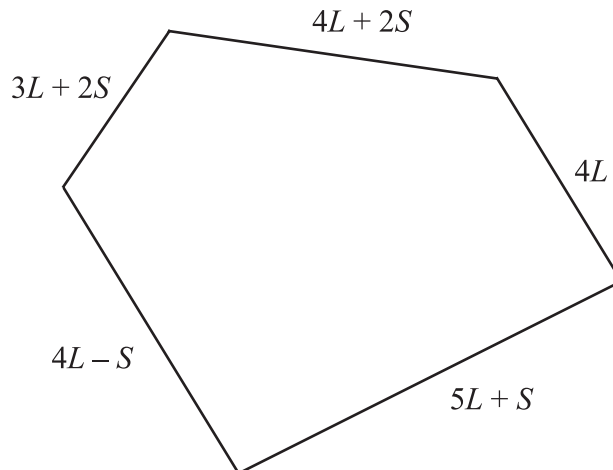
55. Alberto, Mary, and Latisha measured the distance around the school yard using the length of a short stick (S) and the length of a long stick (L). Which expression gives the distance around the outside in simplified form?

    A. $24LS$

  * B. $20L + 4S$

    C. $20L + 6S$

    D. $20LS + 4L$

Use the figure below to answer question 56.

$3x$

$x + 1$
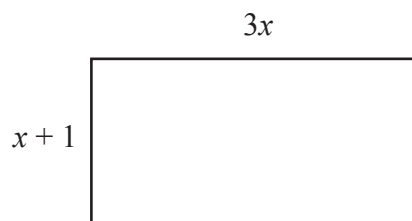
56. Which equation represents the area of the rectangle shown above?

  * A. $A = (3x)(x + 1)$

    B. $A = 3x(x) + 1$

    C. $A = 3x^2 + x$

    D. $A = 6x + 2(x + 1)$

Use the table below to answer question 57.

Arkansas 2001 Legal Occupational Average Annual Income

Lawyers	$70,750
Administrative Law Judges, Adjudicators, and Hearing Officers	$43,760
Arbitrators, Mediators, and Conciliators	$43,480
Judges, Magistrate Judges, and Magistrates	$31,860
Paralegals and Legal Assistants	$27,230
Law Clerks	$25,720
Title Examiners, Abstractors, and Searchers	$25,450
Court Reporters	$24,540

57. Joshua is interested in a career in the legal profession. He looked up the annual incomes of various jobs in the legal profession, shown in the table above. Based on the table, which statement correctly represents Joshua's data?

   A.   A court reporter earns more than a law clerk.

   B.   A lawyer's annual income is more than twice any other legal occupation's annual income.

 * C.   Judges, magistrate judges, and magistrates earn slightly less than half of what lawyers earn.

   D.   Title examiners, abstractors, and searchers have the lowest annual incomes.

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58. Dane Music sells CDs for $12 each. Music Mania sells CDs for $10 each after a one-time membership fee of $16. How many CDs must be purchased for the cost to be the same at both stores?

   A.   2

   B.   3

 * C.   8

   D.   14

59. Sidone can paint half a wall per hour. How long will it take her to paint more than 4 walls?

   A.   less than 2 hours

   B.   exactly 2 hours

   C.   less than 8 hours

 * D.   more than 8 hours

60. The area of France is 1.63×10^4 square kilometers and the area of Germany is 4.75×10^3 square kilometers. How much larger is France than Germany?

   A. 3.12×10^{-1} square kilometers

   B. 3.12×10^1 square kilometers

 * C. 1.155×10^4 square kilometers

   D. 1.155×10^6 square kilometers

ALGEBRA I OPEN-RESPONSE ITEM A

A.   Shawn is driving from Little Rock to Siloam Springs, a distance of 212 miles. He averages 50 mph.

1.   Determine the amount of time it takes Shawn to drive from Little Rock to Siloam Springs. Show or explain all of your work even if you use mental math or a calculator.

Shawn's friend, George, leaves 1 hour later. George arrives in Siloam Springs at the same time Shawn arrives.

2.   Determine George's average speed. Show or explain all of your work even if you use mental math or a calculator.

BE SURE TO LABEL YOUR RESPONSES 1 AND 2.

RUBRIC FOR ALGEBRA I OPEN-RESPONSE ITEM A

SCORE	DESCRIPTION
4	The student earns 4 points. Part 1: correct units of hours or hours and minutes. Part 2: correct units of miles per hour. The response contains no incorrect work.
3	The student earns 3 points.
2	The student earns 2 points.
1	The student earns 1 point or some minimal understanding is shown: Ex. Part 1: $212 \div 50 = 4.24$ hrs. and converts incorrectly to 4 hrs. 24 min. with no other credit.
0	The student earns 0 points. No understanding is shown.
B	Blank – No Response. A score of "B" will be reported as "NA." (No attempt to answer the item. Score of "0" assigned for the item.)

ALGEBRA I OPEN-RESPONSE ITEM B

29 ft.

C

50 ft.

35 ft.

10 ft.

A | 20 ft. | B | 15 ft.

10 ft.

10 ft.

(Not drawn to scale.)
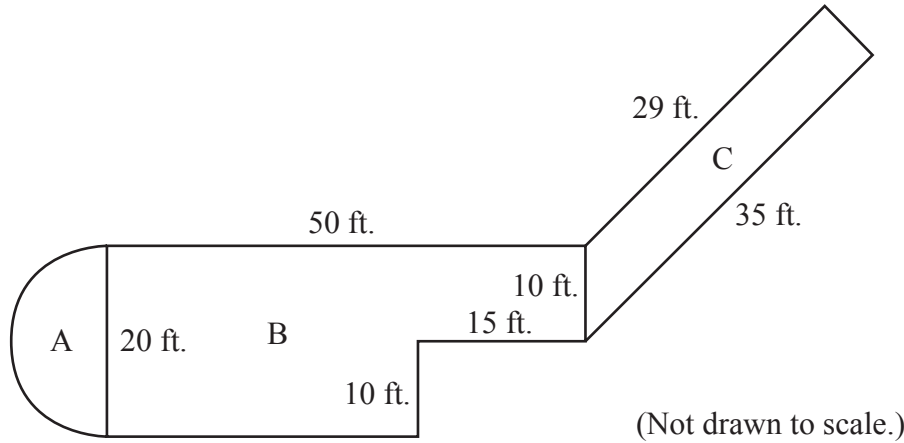
B. A new platform will be added to an overlook near a park's visitor center. The platform can be broken into 3 different areas:

Area of Section A: $\left(\dfrac{20}{2}\right)^2 \bullet \dfrac{\pi}{2}$

Area of Section B: $50 \bullet 20 - 15 \bullet 10$

Area of Section C: $\sqrt{(10^2 - 6^2)} \bullet \dfrac{(29 + 35)}{2}$

1.   Determine the area of each section. Use 3.14 for π. Show all of your steps. Round your answer to the nearest whole number and label it with correct units. Be sure to clearly label each section.

2.   Determine the total area of the platform. Show all of your steps. Round your answer to the nearest whole number and label it with correct units.

BE SURE TO LABEL YOUR RESPONSES 1 AND 2.

RUBRIC FOR ALGEBRA I OPEN-RESPONSE ITEM B

SCORE	DESCRIPTION
4	The student earns 4 points. Correct labels of "sq. ft." for areas of A, B, C, and Total area. The response contains no incorrect work.
3	The student earns 3–3 ½ points.
2	The student earns 2–2 ½ points.
1	The student earns ½–1 ½ points or some minimal understanding is shown.
0	The student earns 0 points. No understanding is shown.
B	Blank – No Response. A score of "B" will be reported as "NA." (No attempt to answer the item. Score of "0" assigned for the item.)

ALGEBRA I OPEN-RESPONSE ITEM C

C. Tara had a block of ice. The temperature of the ice was –20°C. She heated the ice block steadily for 20 minutes. She recorded the temperature the first minute and then every 4 minutes as shown in the table below.

Ice Temperature

Time (minutes)	Temperature (°C)
0	–20
1	0
4	0
8	0
12	20
16	60
20	100

1. Using the grid in your Student Answer Document, create a line graph of the information in the table. Be sure to label all parts of your graph.

2. Determine the temperature's rate of change between the 12th and 20th minutes. Show or explain all of your work even if you use mental math or a calculator.

BE SURE TO LABEL YOUR RESPONSES 1 AND 2.

RUBRIC FOR ALGEBRA I OPEN-RESPONSE ITEM C

SCORE	DESCRIPTION
4	The student earns 4 points. Part 1: graph is titled. Part 2: correct label: ºC/min or º/min. The response contains no incorrect work.
3	The student earns 3–3 ½ points.
2	The student earns 2–2 ½ points.
1	The student earns ½–1 ½ points or some minimal understanding of graphing is shown.
0	The student earns 0 points. No understanding is shown.
B	Blank – No Response. A score of "B" will be reported as "NA." (No attempt to answer the item. Score of "0" assigned for the item.)

ALGEBRA I OPEN-RESPONSE ITEM D

D. Nikki's puppy was 15 cm tall when he was born. The veterinarian gave Nikki the following growth equation where the puppy's height (*H*), in cm, is a function of the age of the puppy in months (*a*):

$$H(a) = 15 + 3.2a, \, 0 < a \le 18$$

1. Identify and label the independent and dependent variables in this function.

2. Determine the height Nikki's puppy will be when he is 1 year old. Show or explain all of your work even if you use mental math or a calculator.

3. Explain why this growth equation only makes sense for $0 < a \le 18$.

BE SURE TO LABEL YOUR RESPONSES 1, 2, AND 3.

RUBRIC FOR ALGEBRA I OPEN-RESPONSE ITEM D

SCORE	DESCRIPTION
4	The student earns 4 points. Part 2: correct units: cm. The response contains no incorrect work.
3	The student earns 3–3 ½ points.
2	The student earns 2–2 ½ points.
1	The student earns ½–1 ½ points or some minimal understanding is shown.
0	The student earns 0 points. No understanding is shown.
B	Blank – No Response. A score of "B" will be reported as "NA." (No attempt to answer the item. Score of "0" assigned for the item.)

ALGEBRA I OPEN-RESPONSE ITEM E

E. In October of 1999, the population of the world was about 6,000,000,000. Suppose there were 6.02×10^{23} pennies on Earth at that time.

1. The pennies are divided equally among the population. Determine the number of pennies that each individual would have in this situation. Express your answer in scientific notation. Show or explain all of your work even if you use mental math or a calculator.

2. Each person spends 1 million pennies per day. Determine how many days it would take each person to spend his or her share of pennies. Express your answer in scientific notation. Show or explain all of your work even if you use mental math or a calculator.

BE SURE TO LABEL YOUR RESPONSES 1 AND 2.

RUBRIC FOR ALGEBRA I OPEN-RESPONSE ITEM E

SCORE	DESCRIPTION
4	The student earns 4 points. The response contains no incorrect work.
3	The student earns 3 points.
2	The student earns 2 points.
1	The student earns 1 point or some minimal understanding is shown: Ex. Part 1: answer of $1.003333333 \times 10^{14}$ with no other credit. Ex. Divides 6.02 by 6, subtracts powers of 10, but does not combine to get answer.
0	The student earns 0 points. No understanding is shown.
B	Blank – No Response. A score of "B" will be reported as "NA." (No attempt to answer the item. Score of "0" assigned for the item.)