A*C*TAAP

Released Item Booklet

Algebra I
Mid-Year End-of-Course Examination

January 2006 Administration

Arkansas Department of Education

1. Tim's income from lamp sales depends on the number of lamps he sells (x). Tim uses the equation $I(x) = (20 - 15)x$ to calculate his income. What values can x have in this equation?

    A. integers

    B. rational numbers

    C. real numbers

    * D. whole numbers

2. A bowl contains pieces of paper, each labeled with a chore. Two read "clean one bathroom," three read "clean one bedroom," one reads "clean the living room," and four read "rake leaves." What is the probability that Sam will pick a chore labeled "rake leaves"?

    A. 1 out of 10

    B. 1 out of 4

    * C. 4 out of 10

    D. 4 out of 4

3. What is $f(0)$ in the function $f(x) = (x - 7)(x + 3)$?

    * A. −21

    B. −4

    C. 0

    D. 21

Use the matrix below to answer question 4.

$$\begin{array}{c} \quad\;\; 1 \quad\;\; 2 \quad\;\; 3 \\ \begin{array}{c} \textbf{tulip} \\ \textbf{gladiola} \end{array} \begin{bmatrix} 42 & 86 & 60 \\ 34 & 64 & 56 \end{bmatrix} \end{array}$$

4. Linda's Flower Box sells tulip and gladiola bulbs to plant. The matrix above shows the numbers of each type she ordered last year from 3 catalogs. This year Linda will triple last year's order. Which matrix shows the number of bulbs she will order this year?

    A. $$\begin{array}{c} \quad\;\; 1 \quad\;\;\; 2 \quad\;\;\; 3 \\ \begin{array}{c} \textbf{tulip} \\ \textbf{gladiola} \end{array} \begin{bmatrix} 42 & 86 & 60 \\ 102 & 192 & 168 \end{bmatrix} \end{array}$$

    B. $$\begin{array}{c} \quad\;\; 1 \quad\;\;\; 2 \quad\;\;\; 3 \\ \begin{array}{c} \textbf{tulip} \\ \textbf{gladiola} \end{array} \begin{bmatrix} 42 & 258 & 60 \\ 34 & 192 & 56 \end{bmatrix} \end{array}$$

    C. $$\begin{array}{c} \quad\;\; 1 \quad\;\; 2 \quad\;\; 3 \\ \begin{array}{c} \textbf{tulip} \\ \textbf{gladiola} \end{array} \begin{bmatrix} 45 & 89 & 63 \\ 37 & 67 & 59 \end{bmatrix} \end{array}$$

    * D. $$\begin{array}{c} \quad\;\;\; 1 \quad\;\;\; 2 \quad\;\;\; 3 \\ \begin{array}{c} \textbf{tulip} \\ \textbf{gladiola} \end{array} \begin{bmatrix} 126 & 258 & 180 \\ 102 & 192 & 168 \end{bmatrix} \end{array}$$

5. The pet shop sells goldfish for x dollars each and hamsters for y dollars each. The sales of goldfish and hamsters for 3 days are represented by the expression below:

$$18x + 3y + 20x + 5y + 22x + 2y$$

Which is the simplified form of the expression?

   A. $10x + 60y$

* B. $60x + 10y$

   C. $70xy$

   D. $70(x + y)$

Use the table below to answer question 6.

Year	Value of Truck
1998	$28,000
1999	$24,000
2000	$20,000
2001	$16,000
2002	$12,000

6. Anson bought a truck for his company in 1998. The table above shows each year and the value of the truck that year. What is the slope of the line that models the value of the truck in terms of the years owned?

* A. $-4,000$

   B. $-\dfrac{1}{4,000}$

   C. $\dfrac{1}{4,000}$

   D. $4,000$

Use the graph below to answer question 7.
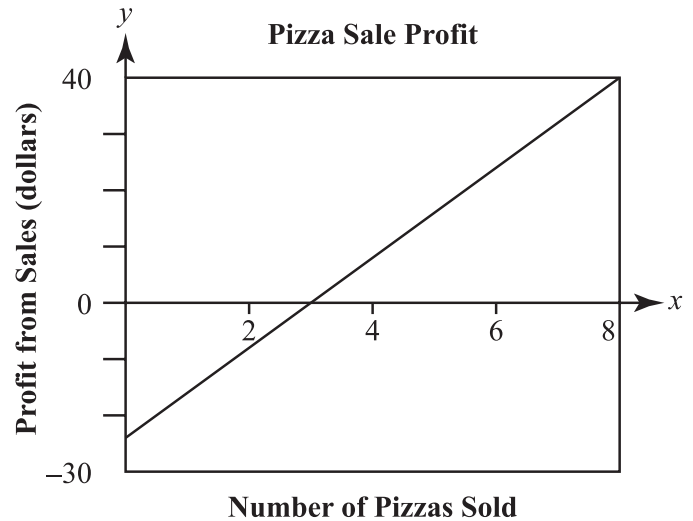
7. The graph above shows the profit Amy hopes to make from selling pizzas during the parade. According to the graph, how many pizzas must she sell for her profit to be zero?

   A. -23

* B.   3

   C.   8

   D.   40

8. A bank advertised annual interest rates of 2% for student savings accounts. Jeff deposited $750 and used the following equation to calculate the amount (A) he would have in the account after 10 years:
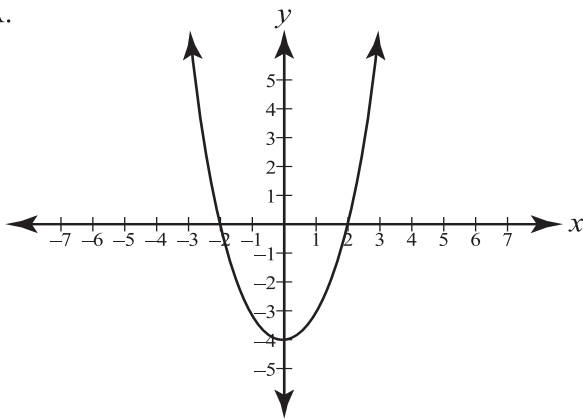
$$A = 750(1 + 0.02)^{10}$$

Which is the exponent in the equation?
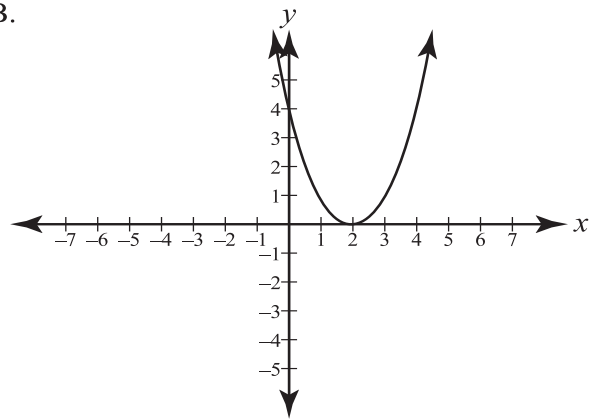
   A.   0.02

   B.   1

* C.   10

   D.   750
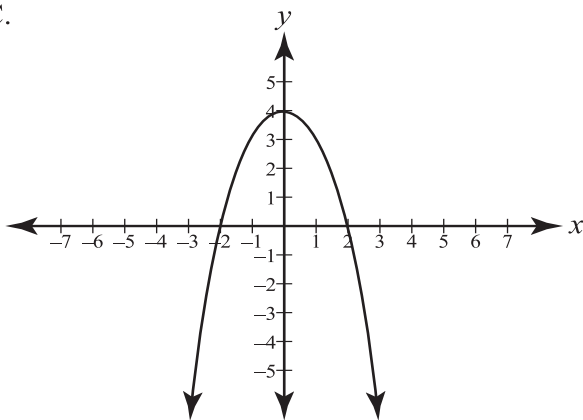
3

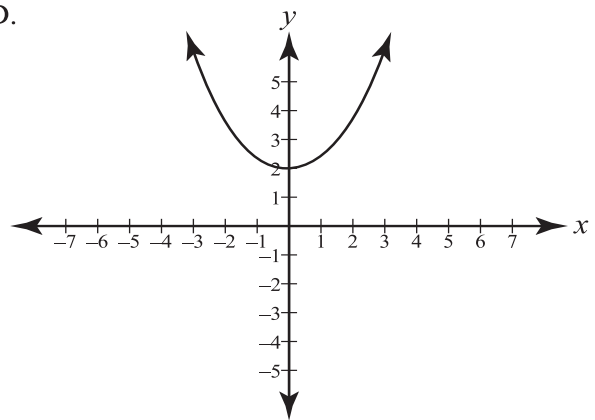**9.** Which graph has its only zero at $x = 2$?

A.

* B.

C.

D.

Use the stem-and-leaf plot below to answer question 10.

The Olde Toy Shoppe
Daily Sales for Second Week of October

10	4
11	5 5
12	2 4 8
13	9

key: 10 | 1 = 101

10. Flora works at The Olde Toy Shoppe and was given the stem-and-leaf plot above for customer sales for the second week of October. Her boss needs her to provide a report with the mean of the data. What is the mean of the data?

   A.   115

 * B.   121

   C.   121.5

   D.   122
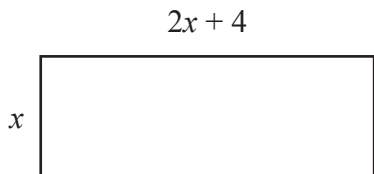
Use the equation below to answer question 11.

$$|2x+1| = 7$$

11.   Tamara is solving the absolute value equation above. Her work is shown below.

Step 1 $2x + 1 = 7$
Step 2 $2x + 1 - 1 = 7 - 1$
Step 3 $2x = 6$
          $x = 3$

or

Step 4 $-2x + 1 = 7$
          $-2x - 1 - 1 = 7 - 1$
          $-2x = 6$
          $x = -3$

Which step contains an algebraic error?

   A.   step 1
   B.   step 2
   C.   step 3
 * D.   step 4

Use the figure below to answer question 12.

$2x + 4$

x

12.   Ralph is building a rectangular dock. The length of the dock is 4 yards more than twice the width, as shown in the figure above. The dock will have an area of 70 square yards. What are the length and width of the dock?

 * A.   5 yards by 14 yards
   B.   7 yards by 18 yards
   C.   11 yards by 26 yards
   D.   22 yards by 48 yards

13.   Tina has $500 in a savings account. After 3 months, Tina can find the amount in her account by evaluating $500 \bullet (1.035)^3$. Which expression is equivalent to $500 \bullet (1.035)^3$?

   A. $500 \bullet (1.035) \bullet 3$
   B. $500 \bullet (1.035 + 1.035 + 1.035)$
 * C. $500 \bullet 1.035 \bullet 1.035 \bullet 1.035$
   D. $500 \bullet (1.035) \bullet 500(1.035) \bullet 500(1.035)$

14.   Simplify:

$$3^2 \bullet 2 + 4(10 - 7).$$

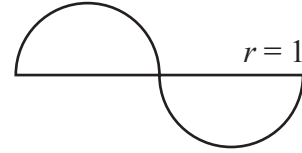 * A.   30
   B.   45
   C.   86
   D.   162

Use the figures below to answer question 15.
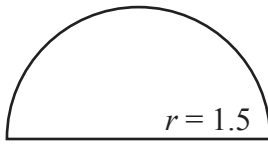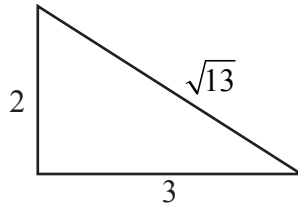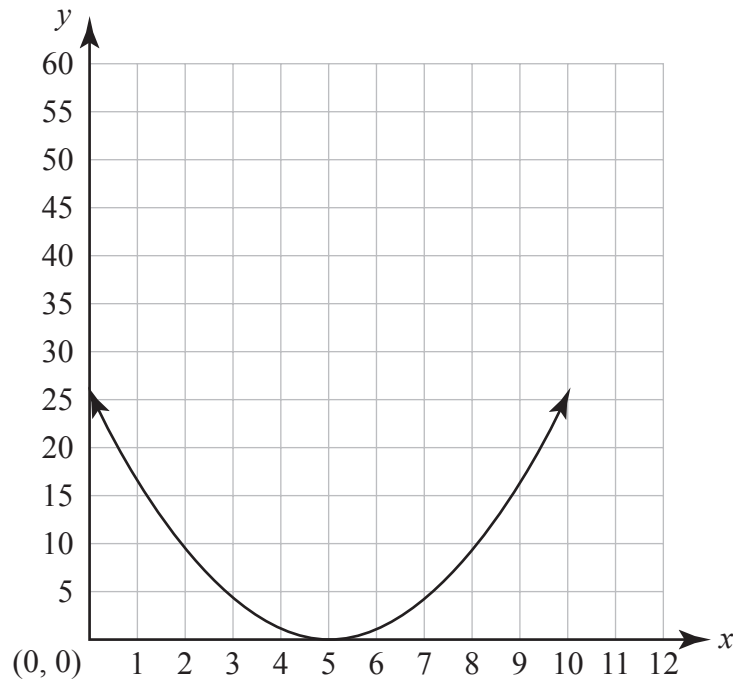
$P = 3 + 1.5\pi$ $P = 5 + \sqrt{13}$ $P = 4 + 2\pi$

15. Which category would best describe the perimeters of the figures above?

 A. integers

 * B. irrational numbers

 C. rational numbers

 D. whole numbers

Use the graph below to answer question 16.

16. The function $f(x) = x^2 - 10x + 25$ is graphed above. What is the zero of this function?

 A. $(0, 5)$

 B. $(0, 25)$

 * C. $(5, 0)$

 D. $(25, 0)$

17. Brian is 57 years old. The largest prime factor of his age equals his son's age. How old is Brian's son?
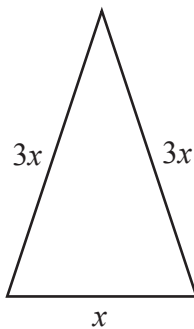
    A.   3

    B.   7

    C.   17

  * D.   19

18. Solve:

$$3+\frac{1}{4}x=-2$$

  * A. $x=-20$

    B. $x=-\dfrac{21}{4}$

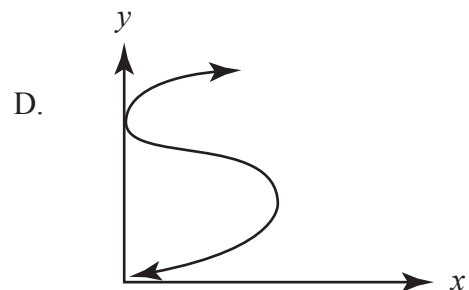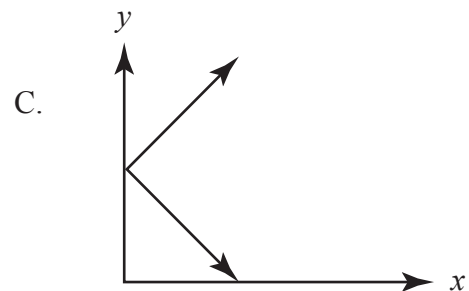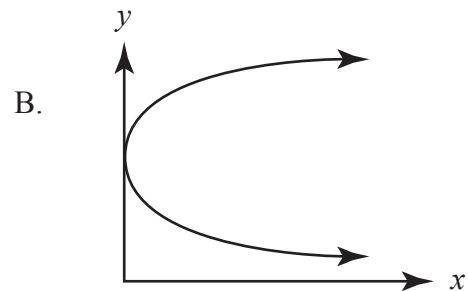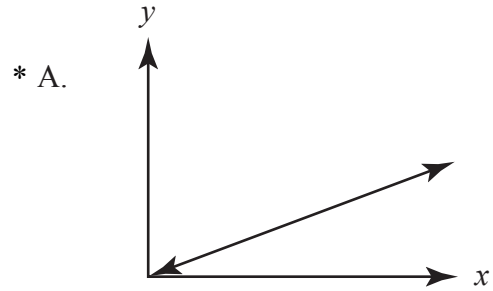   C. $x=-\dfrac{5}{4}$

    D. $x=4$

Use the figure below to answer question 19.

19. Julian has a triangular flower garden. The perimeter of the garden is 84 meters. What is the length of 1 of the longer sides of the garden?

    A.   12 meters

    B.   14 meters

  * C.   36 meters

    D.   42 meters

20. Which graph represents a function?

  * A.

    B.

    C.

    D.

Use the table below to answer question 21.

Number of Candy Bars Sold

	Plain Chocolate	Chocolate with Peanuts	Chocolate with Almonds
Joy	13	5	19
Michael	27	10	30
Sally	7	7	5
Henry	10	20	28

21. The table above shows the number of candy bars sold by 4 members of a club. Each candy bar costs $0.50. Which matrix gives the dollar amount in sales for each type of bar for each club member?

* A.
$$\begin{bmatrix} 6.50 & 2.50 & 9.50 \\ 13.50 & 5.00 & 15.00 \\ 3.50 & 3.50 & 2.50 \\ 5.00 & 10.00 & 14.00 \end{bmatrix}$$

B.
$$\begin{bmatrix} 13.50 & 5.50 & 19.50 \\ 27.50 & 10.50 & 30.50 \\ 7.50 & 7.50 & 5.50 \\ 10.50 & 20.50 & 28.50 \end{bmatrix}$$

C. $\begin{bmatrix} 28.50 & 21.00 & 41.00 \end{bmatrix}$

D.
$$\begin{bmatrix} 18.50 \\ 33.50 \\ 9.50 \\ 29.00 \end{bmatrix}$$

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22. Ten students at Roosevelt High School studied movie-going habits of different age groups. The following set of ordered pairs compares age (x) to the number of movies seen (y) at a local theater in a given month.
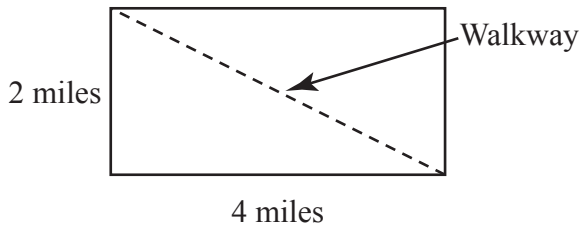
$\{(15, 1), (16, 2), (18, 4), (15, 0), (17, 3), (16, 1), (17, 1), (18, 3), (17, 2), (16, 3)\}$

Which subset of the ordered pairs represents a function?

A. $\{(15, 1), (16, 3), (17, 2), (15, 0)\}$

* B. $\{(15, 1), (17, 2), (18, 4), (16, 1)\}$

C. $\{(16, 1), ((16, 2), (17, 1), (17, 2)\}$

D. $\{(15, 0), (15, 1), (16, 2), (16, 3), (18, 4)\}$

Use the figure below to answer question 23.

2 miles

Walkway

4 miles

(Not drawn to scale.)

23. Cindi rides her bike on the walkway in the city park. The city park is represented by the rectangle above. About how long is the walkway?

   A.   3.4 miles

   B.   3.5 miles

* C.   4.5 miles

   D.   6.0 miles

24. Karen begins riding her bike at a point 6 miles from home. She rides away from home at 3 miles per hour. Which equation represents her distance from home after x hours?

   A. $y = 3x$

* B. $y = 3x + 6$

   C. $y = 6x + 3$

   D. $y = (3 + 6)x$

25. The school nurse writes the height (in inches) and weight (in pounds) of a student as an ordered pair. Which set of ordered pairs is a function?

* A.   {(62, 110), (60, 103), (58, 119), (61, 110)}

   B.   {(55, 95), (54, 98), (50, 82), (55, 92)}

   C.   {(50, 85), (56, 90), (50, 75), (52, 75)}

   D.   {(62, 108), (61, 111), (56, 111), (62, 125)}

26. Solve for x:

$$2x^2 - 18 = 0$$

   A. $x = -9, x = 9$

   B. $x = -3$

* C. $x = -3, x = 3$

   D. $x = 9$

27. Jane is responsible for bringing ice to a marathon. She plans to freeze water in containers that hold 32 ounces each. She knows that the volume of water will increase 9% when it freezes. About how many ounces of water should she put in each container?

   A.   23 ounces

* B.   29 ounces

   C.   35 ounces

   D.   41 ounces

28. Kevin's company has 2 cars for employee use. The number of miles on each car depends on the age of the car (x). Both cars are the same age.

Miles on Car 1: $40,000 + 12,000x$

Miles on Car 2: $4,000 + 18,000x$

For what values of x will car 2 have more miles than car 1?

   A. $x < 1.47$

   B. $x > 1.47$

   C. $x < 6$

* D. $x > 6$

5 Years Ago	Age 7–11	Age 12–17
Football	3.8	7.2
Soccer	2.1	3.8

Present	Age 7–11	Age 12–17
Football	5.1	7.9
Soccer	3.5	6.7

29. Fran researched participation in football and soccer for the city. The tables above show his findings, in thousands of participants. Which matrix would represent the change in participation from 5 years ago to the present?
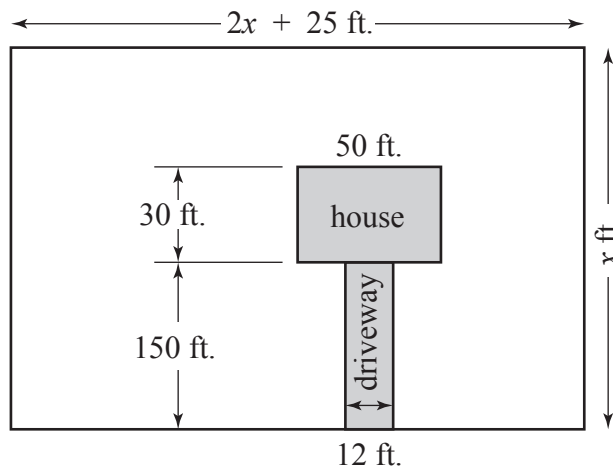
A.
	Age 7-11	Age 12-17
Football	8.9	15.1
Soccer	5.6	10.5

* B.
	Age 7-11	Age 12-17
Football	1.3	0.7
Soccer	1.4	2.9

C.
	Age 7-11	Age 12-17
Football	2.3	0.7
Soccer	1.4	3.9

D.
	Age 7-11	Age 12-17
Football	1.3	3.7
Soccer	5.8	2.9

Use the figure below to answer question 30.

30. Mr. Lonsdale is planting grass in his yard, shown above. He is not planting grass in the shaded area. Which expression represents the number of square ft. of grass Mr. Lonsdale is planting?

A. $2x^2 - 3,275$

B. $2x^2 + 3,325$

C. $2x^2 + 25x + 3,300$

* D. $2x^2 + 25x - 3,300$

31. Regina needs blue, yellow, and green paper. She needs twice as much blue as yellow and 50 fewer sheets of green than blue. She will order x sheets of yellow paper. Which algebraic sentence represents the total number of sheets of paper needed?

 * A. $x + 2x + 2x - 50 = T$

   B. $x + 2x + x - 50 = T$

   C. $2x + 2x - 50 = T$

   D. $x + 2x + 2(x + 50) = T$

32. James needed to drain his swimming pool. Prior to draining it, there were 16,000 gallons of water in the pool. James opened the valve to drain the pool and after 5 hours there were only 4,000 gallons left in the pool. How quickly was the pool draining?

   A.   20 gallons per hour

   B.   800 gallons per hour

 * C.   2,400 gallons per hour

   D.   3,200 gallons per hour

33. Completely factor:

   $x^2 - 15x + 54$

   A. $(x-3)(x+18)$

   B. $(x-18)(x+3)$

   C. $(x-9)(x+6)$

 * D. $(x-9)(x-6)$

Use the matrix below to answer question 34.

	Total	
	Mow	**Trim**
Small Jobs	122	101
Big Jobs	80	35

34. The matrix above shows the total number of jobs Marcus and Kelly completed together during the summer. The matrix below shows the number of jobs Marcus completed on his own.

	Mow	**Trim**
Small Jobs	52	75
Big Jobs	33	26

Which matrix represents Kelly's work?

A.

	Mow	**Trim**
Small Jobs	70	68
Big Jobs	5	9

B.

	Mow	**Trim**
Small Jobs	174	176
Big Jobs	113	61

C.

	Mow	**Trim**
Small Jobs	47	49
Big Jobs	54	2

* D.

	Mow	**Trim**
Small Jobs	70	26
Big Jobs	47	9

35. Angie went bowling. She rented shoes for $2.50 for the day and each game cost $4.00. Using x for the number of games she bowled and y for the total cost for her bowling, which equation represents this situation?

   A. $y = 2.50x + 4.00$

   B. $y = (2.50 + 4.00)x$

   C. $y = 4.00x - 2.50$

 * D. $y = 4.00x + 2.50$

36. Five runners in a race are each assigned a number. Their times are given with their numbers as ordered pairs: {(1, 4:23), (2, 4:15), (3, 4:28), (4, 4:54), (5, 4:32)}. What is the domain of this set?

   A.   (3, 4:28)

   B.   (4, 4:54)

 * C.   {1, 2, 3, 4, 5}

   D.   {4:15, 4:23, 4:28, 4:32, 4:54}

37. Darcie needs to determine about how much money the movie theatre collected yesterday. There were 287 people at the first showing, 298 people at the second showing, 307 people at the third showing, and 419 people for the last show. Tickets were $7 each. Which is the best approximation for the total income from yesterday's showings?

   A. $7,700

   B. $8,400

 * C. $9,100

   D. $9,800

38. Sally earned $1,200 per month plus 5% of her sales (x), represented by $1,200 + 0.05x$. Sally got a raise and now earns $1,310 per month plus 6% of her sales (x), represented by $1,310 + 0.06x$. Which expression shows how much **more** money Sally will earn per month due to her raise?

 * A. $110 + 0.01x$

   B. $110 + 0.01x^2$

   C. $110 + 0.11x$

   D. $1,510 + 0.11x$

39. James has 2 dogs. The larger dog weighs 7 pounds more than twice the weight of the smaller dog (x). Which expression represents the weight of the larger dog?

   A. $2(x + 7)$

 * B. $2x + 7$

   C. $x + 7 + 2$

   D. $7x + 2$

40. A 10-year high school reunion party needs chairs in a reception hall. The reception committee knows that 8 chairs can fit around one table. Which statement must be true?

 * A.   The number of tables depends on the number of people who will attend.

   B.   The number of people who will attend depends on the number of tables.

   C.   The number of people who will attend depends on the number of chairs.

   D.   The number of years after graduation depends on the number of people who will attend.

41. Which can be solved for *x*?

    A. $3x + 5 + 9 \div 1 + x$

    B. $2 - 7x^2 + 8 + x^2$

  * C. $7 + 3x \div 8 \bullet 2 = 8$

    D. $8 + 5 - x + 3(2x)$

42. Brad has a rectangular sandbox. He plans to expand the length and width equally. The new area of his sandbox will be $3x^2 + 10x + 3$. Which shows this area expression completely factored?

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

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

    C. $3x(x + 1)$

    D. $(x + 3)(x + 1)$

Use the table below to answer question 43.

Month	1	2	3	4	5	6	7	8	9
Sarah	0	1	2	3	4	5	6	7	8
Ann	2	3	4	5	6	5	3	2	1

43. The table above shows the amounts that Sarah and Ann saved during different months. In which month did Sarah save twice as much as Ann?

    A.   1

    B.   3

    C.   5

  * D.   7

44. There are 2.54 cm in 1 inch. How could a measurement in *x* inches be converted to centimeters using function notation?

    A. $f(x) = 2.54 + x$

    B. $f(x) = x - 2.54$

  * C. $f(x) = 2.54x$

    D. $f(x) = \dfrac{x}{2.54}$

45. Mr. James gave a 10-point quiz and a 100-point test in a mathematics course. The scores for 6 of his students are shown below (quiz score, test score):

(8, 88) (6, 55) (9, 90) (5, 60) (7, 74) (10, 95)

What is the domain of the ordered pairs?

    A. $\{5 \le \text{quiz score} \le 10\}$

    B. $\{55 \le \text{test score} \le 95\}$

  * C. $\{5, 6, 7, 8, 9, 10\}$

    D. $\{55, 60, 75, 88, 90, 95\}$

46. Einstein's famous equation is $E = mc^2$, where *c* is the speed of light. The speed of light is 3×10^{10} cm/sec. What is c^2?

    A. 9×10^{10} cm^2/sec^2

    B. 3×10^{12} cm^2/sec^2

    C. 9×10^{12} cm^2/sec^2

  * D. 9×10^{20} cm^2/sec^2

Use the table below to answer question 47.

	Apples	Oranges	Bananas
Betsy	3	4	2
Sara	1	4	3

47. The table above shows the numbers of each of 3 kinds of fruit eaten each week by Betsy and Sara. This week both Betsy and Sara have eaten twice as many apples as usual. Which matrix shows the amounts of fruit the girls ate this week?

A.

	Apples	Oranges	Bananas
Betsy	6	8	4
Sara	2	8	6

B.

	Apples	Oranges	Bananas
Betsy	6	8	4
Sara	1	4	3

* C.

	Apples	Oranges	Bananas
Betsy	6	4	2
Sara	2	4	3

D.

	Apples	Oranges	Bananas
Betsy	3	4	2
Sara	2	8	6

48. Which situation can be modeled by the equation $4x = 7$?

A. Nicki buys 7 pencils for $4.

B. Nicki earns $4 each day for 7 days.

C. The temperature fell 4 degrees in 7 hours.

* D. It costs $7 to buy 4 books.

49. Stephanie's Internet provider has a monthly charge of $9.95 for the first 10 hours or less. Which inequality represents the number of hours (h) Stephanie can use the Internet for $9.95?

* A. $0 \le h \le 10$

B. $0 < h < 10$

C. $0 > h \ge 10$

D. $0 > h > 10$

50. Which expression has $3x$ as the greatest common factor?

A. $3x^2 + 6x + 8$

* B. $6x^3 - 3x^2 - 9x$

C. $9x^2 + 11x + 18$

D. $11x^2 - 6x - 15$

51. Completely factor:

$$x^2 + x - 6$$

A. $(x-6)(x+1)$

* B. $(x-2)(x+3)$

C. $(x-3)(x+2)$

D. $(x+6)(x-1)$

52. Maria had 30 minutes to walk and run for exercise. She walked at a constant rate for 10 minutes before stopping to talk to a friend for 10 minutes. Then she ran for 10 minutes at a rate that was twice as fast as her walking pace. Which graph represents Maria's total distance as a function of time?

A.

* B.

C.

D.
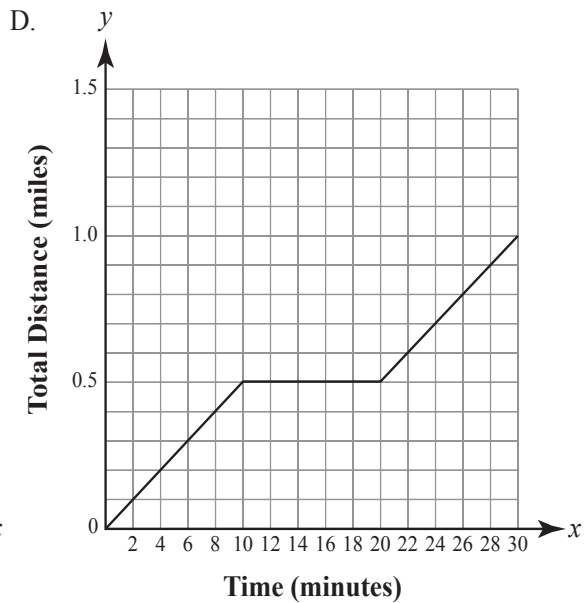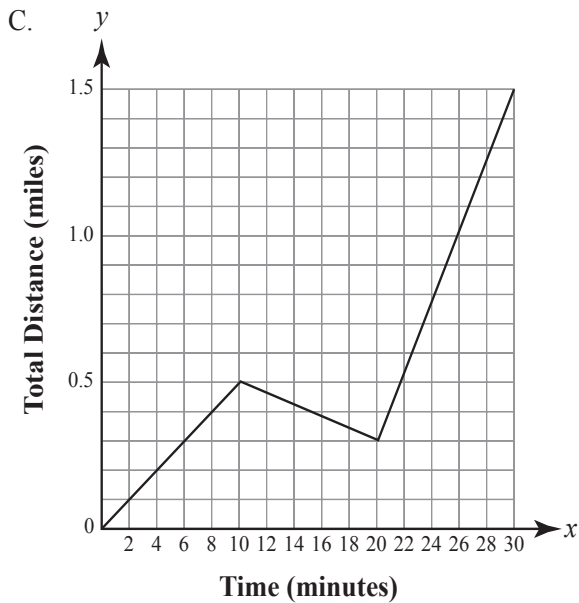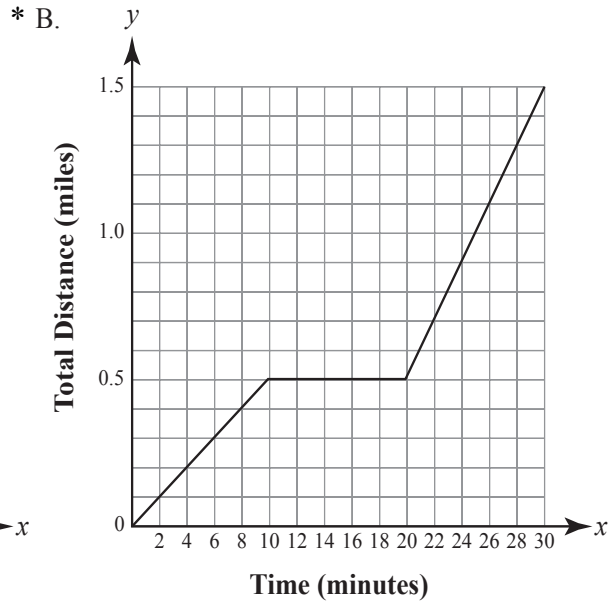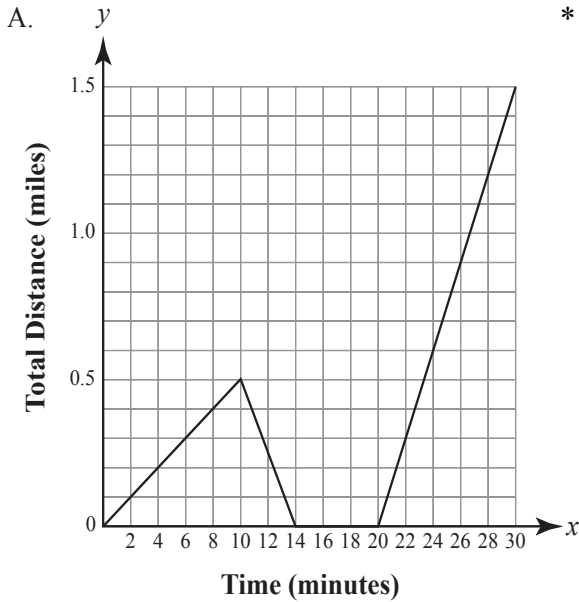
53. Jory's parents bought him a new computer for $1,500. He promised to pay them $10 each week. When will Jory owe his parents less than $1,000?

    A.   before 50 weeks

    B.   at exactly 250 weeks

 * C.   after 50 weeks

    D.   after 250 weeks

54. Sally has 6 fewer pencils than twice the number Nancy has. Which expression represents the number of pencils Sally has?

    A. $2(N-6)$

    B. $6-2N$

 * C. $2N-6$

    D. $2(6-N)$

55. Which situation would require finding the quotient?

    A.   finding the perimeter of a lawn that measures 36 feet by 27 feet

 * B.   finding the hourly speed of a car traveling 100 miles in 2 hours

    C.   finding the total cost of $4\frac{1}{2}$ pounds of apples priced at $0.89 per pound

    D.   finding the length of a movie that starts at 2:10 P.M. and ends at 4:48 P.M.

Use the graph below to answer question 56.
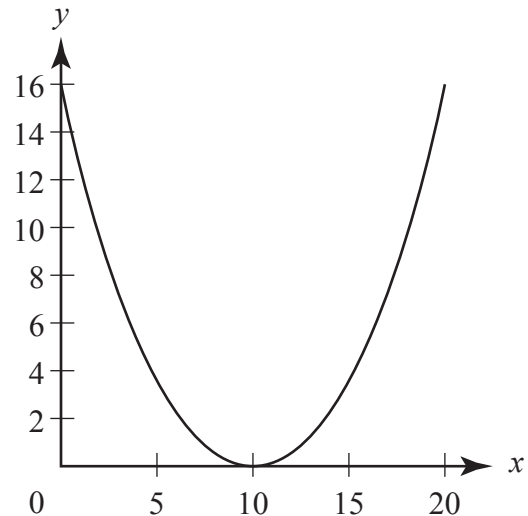
56. Darrin skateboards at the local skateboard park. A ramp at the park is shaped like the parabola shown above. Darrin's distance above the ground (y) depends on x. What is the solution for x when $y = 0$?

    A.   2

    B.   8

 * C.   10

    D.   16

57. The amount of profit (P) earned over time (t) can be represented by the equation $P = 2t^2 - 12t + 18$. When will profit equal zero?

    A. $t = 0$

    B. $t = 2$

 * C. $t = 3$

    D. $t = 18$

58. A single-scoop ice cream cone costs $3.00. Each extra scoop of ice cream costs $0.40. Joe has $5 to spend on an ice cream cone. The inequality $3 + 0.40x \leq 5$ represents how many extra scoops (x) of ice cream Joe can buy. How many extra scoops of ice cream can Joe buy?

* A. $x \leq 5$

   B. $x \geq 5$

   C. $x \leq 9.5$

   D. $x \geq 9.5$

59. Multiply:

$$(3w + 4)(w + 4)$$

A. $9w^2 + 24w + 16$

B. $3w^2 + 24w + 48$

C. $3w^2 + 24w + 16$

* D. $3w^2 + 16w + 16$

Use the matrices below to answer question 60.

Mapletown

	3×5	5×7	8×10
White	7	12	15
Red	4	6	8
Blue	8	8	6

Oakdale

	3×5	5×7	8×10
White	5	0	5
Red	2	4	4
Blue	6	2	6

60. A copying company has 2 locations, one in Mapletown and the other in Oakdale. The owner keeps a record of how many copies are made at each store using a matrix system. She records the number of copies made by color and size of paper. The record for Monday morning is shown above. Which matrix represents how many copies were made on Monday at both stores?

A.

	3×5	5×7	8×10
White	2	12	10
Red	2	2	4
Blue	2	6	0

* B.

	3×5	5×7	8×10
White	12	12	20
Red	6	10	12
Blue	14	10	12

C.

	3×5	5×7	8×10
White	12	14	21
Red	4	10	10
Blue	13	12	12

D.

	3×5	5×7	8×10
White	6	6	10
Red	3	5	6
Blue	7	5	6

MATHEMATICS OPEN-RESPONSE ITEM A

Use the table below to answer question A.

Minutes (x)	Amount of Water Used (gallons)
0.5	1.25
1.5	3.75
2.5	6.25
3.5	8.75
4.5	11.25

A. Thomas took a 12-minute shower. The table shows the increase in the amount of water Thomas used as time passed.

1. Write an equation that represents the amount of water used as a function of the amount of time. Show or explain all of your work even if you use mental math or a calculator.

2. Determine the amount of water used when $\dfrac{3}{4}$ of the time had passed. Show or explain all of your work even if you use mental math or a calculator. Include units in your answer.

BE SURE TO LABEL YOUR ANSWERS 1 AND 2.

RUBRIC FOR MATHEMATICS OPEN-RESPONSE ITEM A

SCORE	DESCRIPTION
4	The student earns 4 points. Response contains the correct label of "Gallons" in Part 2. 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 shown: Ex: ¾(12) = 9 only
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 – Zero Score).

MATHEMATICS OPEN-RESPONSE ITEM B

Use the figure below to answer question B.

(Not drawn to scale.)
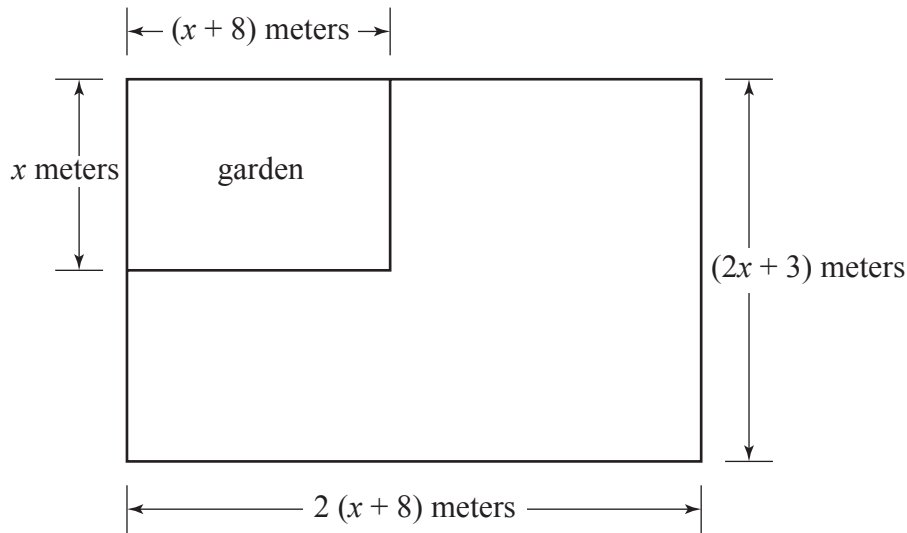
B. Christine has a garden in her yard. The yard is $(2x + 3)$ meters wide and $2(x + 8)$ meters long. The lengths and widths of the garden are shown above.

1. Represent the area of the garden in terms of x. Also represent the area of the entire yard in terms of x. Simplify your answers. Show or explain all of your work even if you use mental math or a calculator.

2. Represent the area of the yard that is **not** part of the garden in terms of x. Simplify your answer. Show or explain all of your work even if you use mental math or a calculator.

3. The area of the yard that is **not** part of the garden is 120 square meters. Determine the value of x. Show or explain all of your work even if you use mental math or a calculator.

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

RUBRIC FOR MATHEMATICS OPEN-RESPONSE ITEM B

SCORE	DESCRIPTION
4	The student earns 6 points. Label of "m²" must be referred to somewhere in the response. Response contains no incorrect work.
3	The student earns 4 ½ – 5 ½ points.
2	The student earns 2 ½ – 4 points.
1	The student earns ½ – 2 or some minimal understanding 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 – Zero Score).

MATHEMATICS OPEN-RESPONSE ITEM C

C. Avery takes piano lessons. Each week she records how many minutes she practices:

- During week 1 she practiced 28 minutes more than week 5.
- During week 2 she practiced 13 minutes less than week 5.
- During week 3 she practiced 25 minutes less than 2 times week 5.
- During week 4 she practiced an equal amount of time as week 5.

1.   Represent each week's practice time in terms of week 5's practice time (x).

The total practice time for the 5 weeks was 440 minutes.

2.   Determine the number of minutes Avery practiced during week 2. Show or explain all of your work even if you use mental math or a calculator.

BE SURE TO LABEL YOUR ANSWERS 1 AND 2.

RUBRIC FOR MATHEMATICS OPEN-RESPONSE ITEM C

SCORE	DESCRIPTION
4	The student earns 4 points. Label of "minutes" is not required in Part 2. 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 or some minimal understanding shown.
	     Ex: The equation shows some understanding even though expressions are not
	       defined:
	       $28 + x - 13 + 5x - 25 + x = 440$

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 – Zero Score).

MATHEMATICS OPEN-RESPONSE ITEM D

D. Alex owns a taxi cab service and has 25 drivers. His daily expense (E) for his business depends on the number of drivers (n) he has working. His expense, in dollars, is modeled by the following formula:

$$E = -80|n - 20| + 965$$

On Monday, Alex had 15 drivers working.

1. Determine Alex's expenses on Monday. Show or explain all of your work even if you use mental math or a calculator.

On Tuesday, Alex's expenses were $405.

2. Determine the number of drivers, out of 25 available, who were working on Tuesday. Show or explain all of your work even if you use mental math or a calculator.

BE SURE TO LABEL YOUR ANSWERS 1 AND 2.

RUBRIC FOR MATHEMATICS OPEN-RESPONSE ITEM D

SCORE	DESCRIPTION
4	The student earns 4 points. Response contains no incorrect work.
3	The student earns 3 – 3 ½ points Or Part 2 is completely correct and Part 1 contains correct but incomplete procedure or work contains 1 calculation error.
2	The student earns 2 – 2 ½ points Or Part 2 is completely correct and Part 1 is incorrect due to a procedural error or is missing.
1	The student earns ½ – 1 ½ or some minimal understanding shown: Ex: Thinks $\lvert n - 20 \rvert = \lvert n \rvert + \lvert -20 \rvert = n + 20$ and proceeds.
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 – Zero Score).

MATHEMATICS OPEN-RESPONSE ITEM E

E.   Jake is an engineer. He is calculating the amount of weight (*W*), in pounds, that can be safely placed on a steel beam. The amount of weight, to the nearest pound, for this beam is given by the equation $W = (0.06x^2 - 2.42x + 38.71)^2$, where *x* is the length of the beam in ft.

Length	4-ft. long	8-ft. long	12-ft. long	16-ft. long
Weight	899	538	335	

1.   Determine the amount of weight, to the nearest pound, that can be safely placed on a 16-ft. long beam. Show or explain all of your work even if you use mental math or a calculator.

2.   Using the grid in your Student Answer Document, construct a bar graph showing the safe weights of the 4 beams from the table in part 1. Label all parts of your bar graph.

BE SURE TO LABEL YOUR ANSWERS 1 AND 2.

RUBRIC FOR MATHEMATICS OPEN-RESPONSE ITEM E

SCORE	DESCRIPTION
4	The student earns 4 points. Title of graph must be included. 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 or some minimal understanding shown. Ex: W = [(.06)(16) ² – (2.42)(16) + 38.71] ² only with incorrect or no answer Ex: Graph with segments connecting correctly plotted points only Ex: 235.6 (lbs.) only
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 – Zero Score).