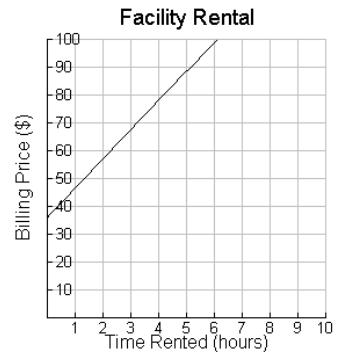


Algebra I

For questions 1 through 25, mark your answer choice on the answer sheet provided. After completing items 1 through 25, answer each of the tiebreaker items in sequential order (do #1 first, followed by #2, and then #3 last). Be sure that your name is printed on each of the tiebreakers.

- Consider the sum $p + q$, where p is rational and q is irrational. For which of the following circumstances is the sum $p + q$ rational?
 - The sum is rational when $p = 0$.
 - The sum is rational when $p = q$.
 - The sum is rational when $p > q$.
 - The sum is never rational.

- A local restaurant offers a meeting area for groups to rent. The restaurant charges \$36.00 as a rental fee and \$10.50 per hour to pay the restaurants' two employees assigned to that group. The manager of the restaurant uses the equation $y = 10.50x + 36$ to calculate the billing price. This relationship is shown in the graph to the right.



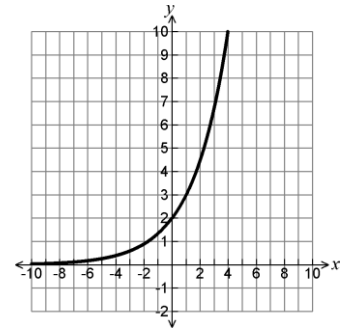
The manager decides to change the rental fee to \$28.00 starting next month. How will this change affect the graph?

- The slope will decrease.
 - The y-intercept will decrease.
 - The slope will increase.
 - The y-intercept will increase.
- Use the table at the right to solve the problem. Which of the following is true for $x \geq 3$?
 - $f(x) \neq g(x)$
 - $f(x) \leq g(x)$
 - $f(x) = g(x)$
 - $f(x) \geq g(x)$

x	$f(x)$	$g(x)$
0	1	0
1	3	1
2	9	8
3	27	27

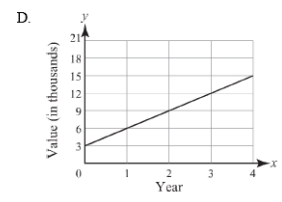
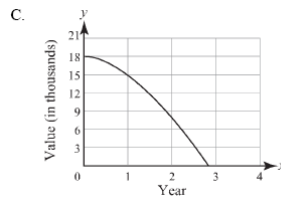
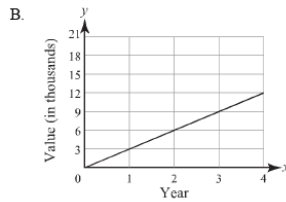
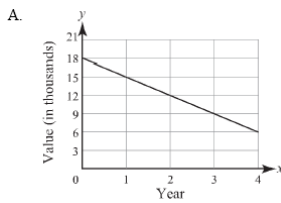
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4. The graph of $f(x) = 2\left(\frac{3}{2}\right)^x$ is shown at the right. What would change



if the base $\frac{3}{2}$ were changed to a base of $\frac{2}{3}$?

- A. The graph would increase faster.
 - B. The graph would increase slower.
 - C. The graph would flip over the x -axis.
 - D. The graph would represent decay.
5. The value of a car is \$18,000 when new, and its value decreases \$3,000 per year. Which graph shows the value of the car for the first 4 years?



6. Which of the following is equivalent to $16^{\frac{1}{4}}$?

- I. 4^2
- II. $8^{\frac{1}{3}}$
- III. $\sqrt[4]{16}$
- IV. $\sqrt{16}$

- A. I and II B. II only C. III and IV D. II and III

7. The number of crimes that occurred in a certain city per 1000 people decreased from 46.2 in 1920 to 45.0 in 1960. Which of the following is the correct average rate of change in the number of crimes per 1000 people that occurred from 1920 to 1960?

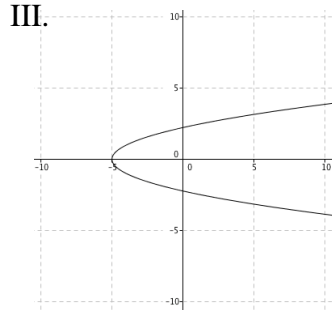
- A. -33.33 crimes per 1000 people per year
- B. -0.03 crimes per 1000 people per year
- C. -0.03 crimes per 1000 people
- D. -33.33 crimes per 1000 people

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8. Which of the following relations is a function?

I. $\{(5, 2), (9, 7), (-3, 0), (2, 5)\}$

II. $x = 3$



IV. $y = x^2 + 4$

- A. I only B. I and IV C. III only D. II and III

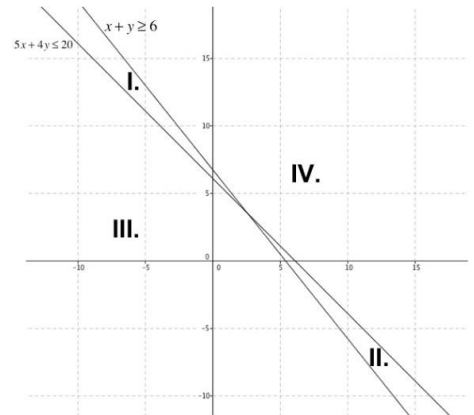
9. For which value of x will the graph of $y = 3^x$ exceed the graph of $y = 4x + 17$?

- A. 1 B. 2 C. 3 D. 4

10. Which region of the graph on the right represents the solution set of the inequalities?

$$\begin{cases} x + y \geq 6 \\ 5x + 4y \leq 20 \end{cases}$$

- A. I B. II C. III D. IV



11. Five swimmers compete in the 50-meter race. Their times are given in the table below. To what place can the times be rounded without affecting the result of the race?

Lane	Time (seconds)
1	23.4213
2	23.1857
3	23.2196
4	23.3512
5	23.2242

- A. tenths B. hundredths C. thousandths D. ten-thousandths

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12. A rectangle has length 2 feet longer than its width and has a perimeter of 20 feet. What is the width of this rectangle?

- A. 4 feet B. 5 feet C. 6 feet D. 20 feet

13. The formula $A = Pe^{rt}$ calculates the final amount of a loan of P dollars, compounded continuously at interest rate r for t years. Choose the formula that correctly represents the formula for the amount of the loan P .

- A. $P = Aert$ B. $P = \frac{e^{rt}}{A}$ C. $P = \frac{A}{e^{rt}}$ D. $P = Ae^{rt}$

14. Admission to the state fair is \$4.00 per child and \$7.00 per adult. On a particular day the fair collected \$6993 in admissions fees for 1,200 tickets. How many children and how many adults attended that day?

- A. 724 adults, 476 children
B. 750 adults, 450 children
C. 711 adults, 489 children
D. 731 adults, 469 children

15. Tamara is solving the absolute value equation $|2x + 1| = 7$. Her work is shown below:

Line 1: $2x + 1 = 7$		Line 4: $-2x + 1 = 7$
Line 2: $2x = 6$	OR	Line 5: $-2x = 6$
Line 3: $x = 3$		Line 6: $x = -3$

Which line contains the error?

- A. Line 1 B. Line 3 C. Line 4 D. Line 6

16. Which of the following are the points of intersection between the line $y = 2x + 4$ and the parabola $y = x^2 - x - 6$?

- A. (-2,14) and (5,0)
B. (-2,0) and (5,14)
C. (0,-2) and (14,5)
D. (0,14) and (-2,5)

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17. Which of the following are the zeroes of $y = x^2 - 2x - 15$?

- A. (-5,0) and (3,0) B. (5,0) and (-3,0)
C. (0,-5) and (0,3) D. (0,5) and (0,-3)

18. Simplify $\frac{a^2-b^2}{a-b}$

- A. $a + b$
B. $a^2 + b^2$
C. $a - b$
D. Does not simplify

19. Solve for n

$$n^2 + m^2 = 10$$

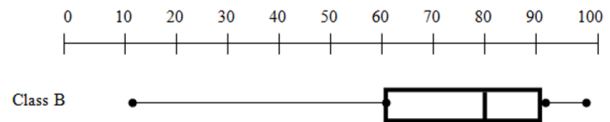
- A. $n = 100 - m^2$
B. $n = \pm\sqrt{m^2 - 10}$
C. $n = \sqrt{10} - m$
D. $n = \pm\sqrt{10 - m^2}$

20. A car rental charges \$30 per day and \$0.15 per mile. Jack is charged \$41.40 for his one-day rental. How many miles did he drive?

- A. 474 miles B. 136.5 miles C. 76 miles D. 0.73 miles

21. The box and whisker plot represent the test scores for students in an Algebra I class.

Using the box and whisker graph to the right, which of the following represent the interquartile range, median, and outliers?



- A. IQR= 30, Median= 79, Outliers= 11 and 98
B. IQR= 10, Median= 43, Outliers= 29 and 64
C. IQR= 60, Median= 79, Outliers= 10 and 90
D. IQR= 40, Median= 65, Outliers= 35 and 75

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22. The data in the table below show the distance that some people live from New York City and the median price of a home in their neighborhood. Which of the following is the linear model and the correlation coefficient for the given data?

- A. Linear Model: $y = -5.38 + 446.49$
Correlation Coefficient: $-.85$
- B. Linear Model: $y = 9.56x + 463.64$
Correlation Coefficient: 0.56
- C. Linear Model: $y = -6.44x + 457.66$
Correlation Coefficient: 0.87
- D. Linear Model: $y = 6.44x + 500$
Correlation Coefficient: -0.89

Distance from New City (mi.)	Median home price (in \$1000s)
12	390
15	400
28	310
20	290
5	410
9	400

23. The number of floors of each building in a particular city is recorded. Using intervals of 5, how many data points are in the interval 26-30?

Number of Floors																			
24	38	46	16	28	31	12	27	32	49	33	12	38	34	48	22	36	29	47	41
49	30	21	17	40	13	32	15	31	21	13	16	43	33	30	25	28	29	13	11

- A. 3 B. 5 C. 7 D. 9

24. The following is a stem and leaf plot for the lowest temperatures recorded for the entire month of January in Arkansas. Which of the following is true about the relationship among the mean, median, mode and range?

Stems	Leaves
2	2 4 8 8 8 9 9
3	0 2 2 4 6 6 8
4	1 1 4 6
5	0 2

- A. The mean is greater than the median.
- B. The mode is greater than the median.
- C. The range is equal to the mean.
- D. Median is less than the range.

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25. The graph on the right represents the data collected for number of sales of peanut butter and the number of sales of jelly for 2010.

The correlation between peanut butter sales and jelly sales is

- A. Strong Positive Correlation
- B. Strong Negative Correlation
- C. Weak Positive Correlation
- D. Weak Negative Correlation



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Tie-Breaker 1

Jessica's restaurant supply store has 20 feet of dividers with which to set off a rectangular area for the storage of overstock. If a corner of the store is used for the storage area, the partition need only form two sides of the rectangle.

- A. Express the floor area of the storage space as a function of the length of the partition.
- B. Find the dimensions that would maximize the floor area.
- C. Determine the maximum area of the storage space.

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Tie-Breaker 2

The only coins that Alexis has are dimes and quarters.

- Her coins have a total value of \$5.80
 - She has a total of 40 coins.
-
- A. Create a system of equations that represents the situation.
 - B. Determine how many of each type of coin Alexis has.
 - C. Create a graph for the representation between the two systems of equation.

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Name: _____

Tie-Breaker 3

On September 1st, Diana started a new job earning \$8 an hour after taxes. She will work no more than 30 hours a week and no less than 5 hours a week. Each week she spends \$25 for gas to and from work.

- A. Write a function that represents the amount of money Diana could save each week based on the number of hours worked and gas expenses. Be sure to define the variables.
- B. Identify the domain and range of the function written in Part A. Show or explain all your work.

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Key:

1. D
2. B
3. D
4. D
5. A
6. D
7. B
8. B
9. D
10. B
11. C
12. A
13. C
14. D
15. C
16. B
17. B
18. A
19. D
20. C
21. A
22. A
23. C
24. A
25. C

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Tie Breakers:

1.

A) $A(x) = (20 - x)x = 20x - x^2$

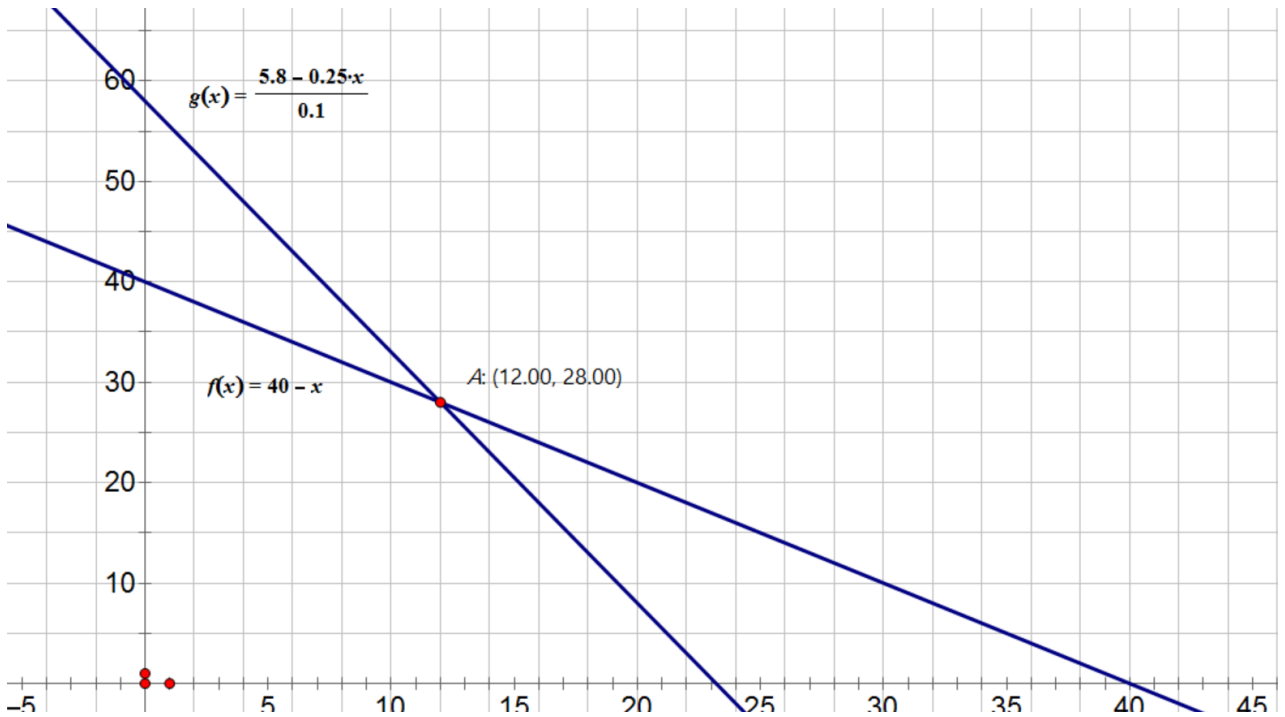
B) 10 feet by 10 feet

C) 100 feet squared

2.

A) $.10D + .25Q = 5.8$

B) 12 quarters and 28 dimes



3.

A) $f(x) = 8x - 25$

B) Domain: $[5, 30]$

Range: $[15, 215]$