1

Two functions, $q(x)$ and $r(x)$, are shown.

$q(x) = (1.05)^x$
$r(x) = 38x + 125$

Both functions have domains of $x > 0$.

Which statement about $q(x)$ and $r(x)$ is true?

Ⓐ $q(x) > r(x)$ for all values of x.

Ⓑ $r(x) > q(x)$ for all values of x.

Ⓒ $q(x) > r(x)$ only for very large values of x.

Ⓓ $r(x) > q(x)$ only for very large values of x.

2

Some friends spent a total of $12.00 on popcorn and drinks at the movie theater. A bucket of popcorn cost $2.00 and a drink cost $1.50.

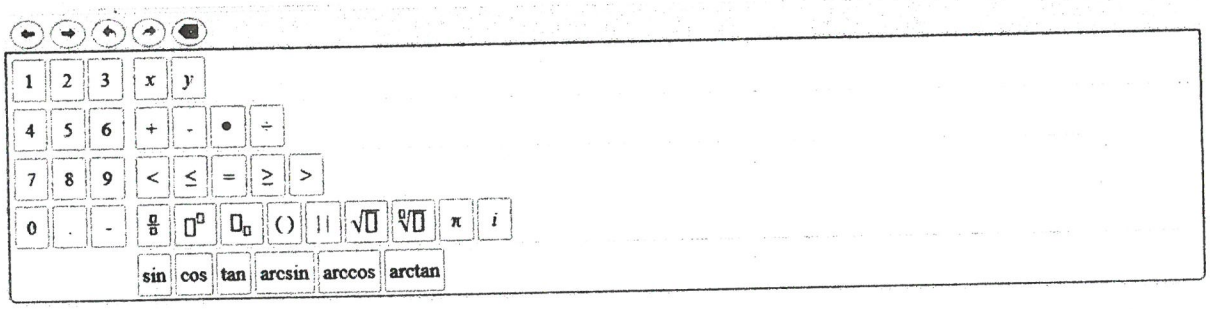
A. Create an equation to represent the relationship between the number of buckets of popcorn, x, and the number of drinks, y, the friends bought for $12.00.

The friends bought 4 drinks.

B. How many buckets of popcorn did they buy?

A.

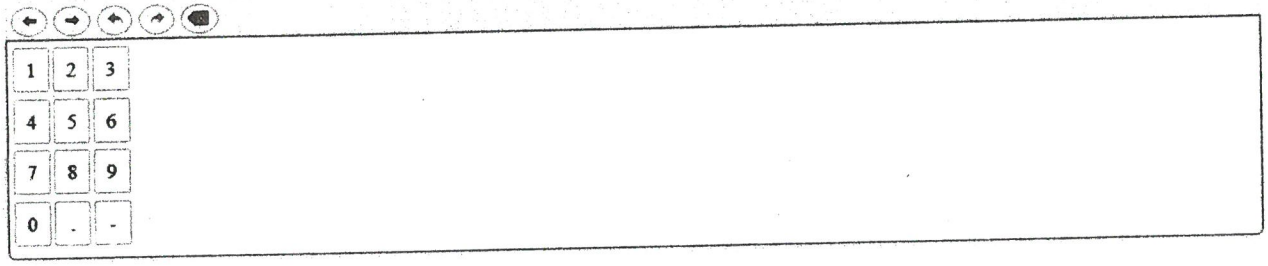
B.



3

The graph of quadratic function $f(x)$ has a minimum at $(-2, -3)$ and passes through the point $(2, 13)$. The function $g(x)$ is represented by the equation $g(x) = -(x+2)(x-3)$.

How much greater is the y-intercept of $g(x)$ than $f(x)$?



4

An equation is shown.

$4[a + (-7)] + 10[2a + 3] = 1$

Drag a statement to each box to justify each step.

Steps	Justifications
1. $4[a + (-7)] + 10[2a + 3] = 1$	1. Given
2. $4a + (-28) + 20a + 30 = 1$	2.
3. $(-28) + 4a + 20a + 30 = 1$	3.
4. $(-28) + (4a + 20a) + 30 = 1$	4.
5. $(-28) + 24a + 30 = 1$	5. Addition

Addition property of equality

Associative property of addition

Commutative property of addition

Distributive property

Multiplication property of equality

5

The model $n(t) = 2^t$ represents the number of bacteria in a petri dish after t hours, where $t = 0$ represents the time when the bacteria were first put into the dish.

What is the correct value and interpretation of $n(8)$?

Ⓐ $n(8) = 256$, so after 8 hours there are 256 bacteria.

Ⓑ $n(8) = 256$, so after 256 hours there are 8 bacteria.

Ⓒ $n(8) = 3$, so after 8 hours there are 3 bacteria.

Ⓓ $n(8) = 3$, so after 3 hours there are 8 bacteria.

6

The gravitational potential energy of an object is given by the formula $P = mgh$.

Which equation is correctly solved for the height, h?

Ⓐ $h = P + mg$

Ⓑ $h = P - mg$

Ⓒ $h = \frac{P}{mg}$

Ⓓ $h = Pmg$

7

Which expression is equivalent to $(2r^2 + r - 1) - (3r^2 + 4r - 5)$?

Ⓐ $-r^2 - 3r + 4$

Ⓑ $-r^2 + 5r - 6$

Ⓒ $5r^2 - 3r + 4$

Ⓓ $5r^2 + 5r - 6$

8

A system of equations is shown.

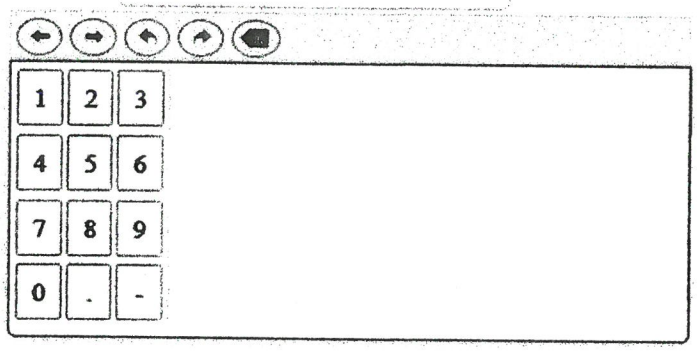
$4c + 2d = 11$

$\frac{7}{2}d = 41 - 22c$

What is the solution to the system?

$c =$

$d =$

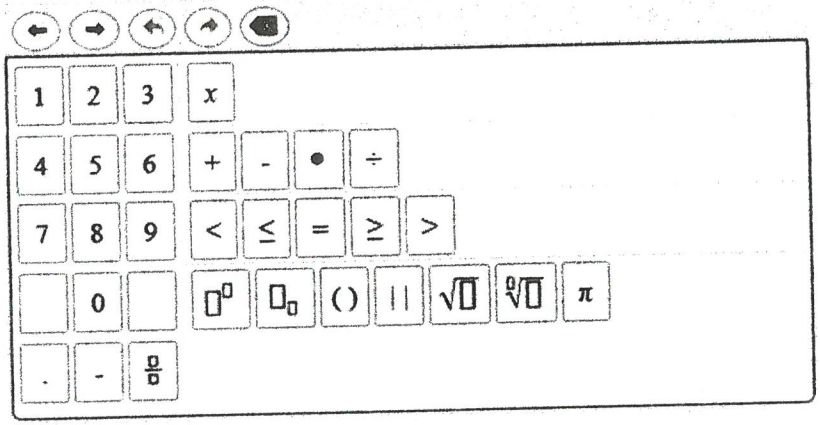


9

An expression is given.

$x^4 - 144$

Rewrite the expression as the product of two binomials.



10

A linear function is shown.

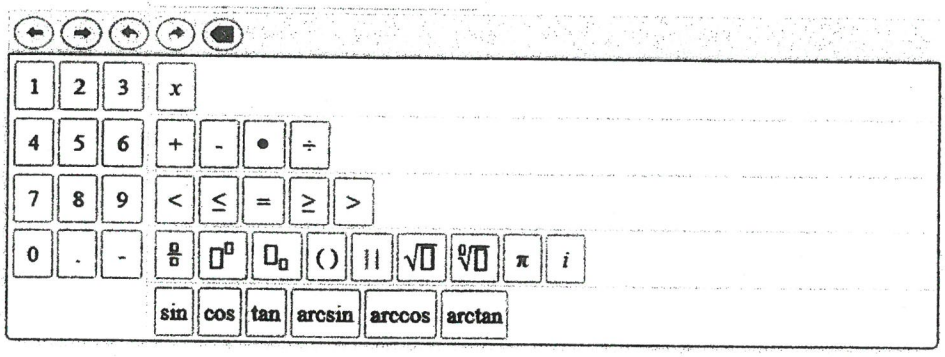
$f(x) = \frac{-5}{2}x - 3$

A. Create a linear function $g(x)$ such that $f(x) = g(x)$ has exactly one solution.

B. What is the exact solution to $f(x) = g(x)$?

$A.\ g(x) =$

$B.\ x =$



11

A function is shown.

$h(t) = -t^2 + 10t - 16$

For which interval of t-values is the function both positive and increasing?

Ⓐ $t < 5$

Ⓑ $t > 8$

Ⓒ $2 < t < 5$

Ⓓ $5 < t < 8$

12

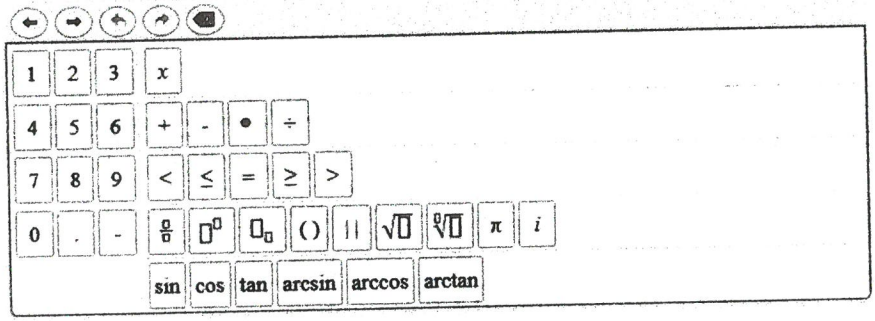
A function is shown, where b is a real number.

$f(x) = x^2 + bx + 144$

The minimum value of the function is 80.

Create an equation for an equivalent function in the form $f(x) = (x - h)^2 + k$.

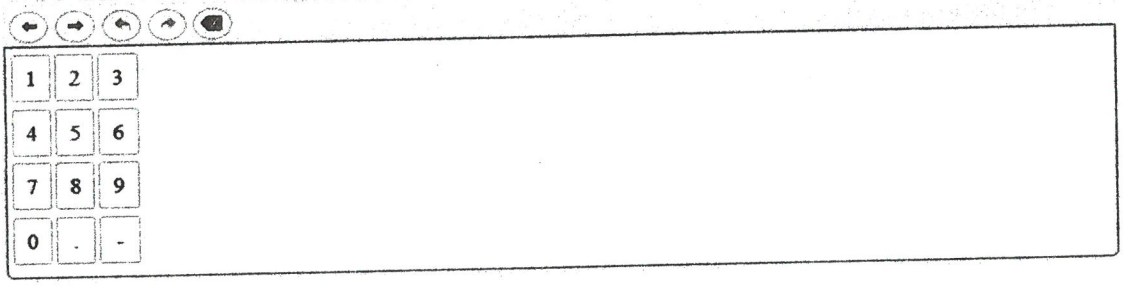
$f(x) =$



14

The function $f(t) = -16t^2 + 20t + 4$ gives the height of a ball, in feet, t seconds after it is tossed.

What is the average rate of change, in feet per second, over the interval [0.75, 1.25]?



15

In 2015, Macon County had a population of 53,792. The population increases by 2.5% annually.

Which function can be used to model the population t years after 2015?

(A) $f(t) = 1.025t + 53{,}792$

(B) $f(t) = 1.25t + 53{,}792$

(C) $f(t) = 53{,}792(1.025)^t$

(D) $f(t) = 53{,}792(1.25)^t$

16

A survey of 525 people was conducted to determine whether they have brothers and sisters.

- The results showed that 24% of the people surveyed do not have a sister and 68% of the people surveyed have a brother.
- The results also showed that 93 of the people surveyed do not have a sister and do not have a brother.

Complete the two-way frequency table to show the results of the survey.

	Have a Brother	Do Not Have a Brother	Total
Have a Sister			
Do Not Have a Sister			
Total			525

18

A quadratic equation is shown.

$0 = x^2 - 3x - 4$

Which value is a solution to this equation?

(A) 1

(B) 2

(C) 3

(D) 4

19

Select all of the values of a correlation coefficient that suggest a strong linear relationship between two variables.

- [ ] 0.8
- [ ] 0.4
- [ ] 0
- [ ] −0.1
- [ ] −0.9

20

Juan collects data on the number of hot dogs sold at a hot dog stand each hour one day and the number of cars that drive by the stand in that hour. His data are shown in the table.

Number of Hot Dogs Sold	Number of Cars
30	73
9	32
21	56
0	11
24	62

Based on his data, which conclusion can Juan make?

(A) An increase in cars is associated with a decrease in hot dog sales.

(B) An increase in cars is associated with an increase in hot dog sales.

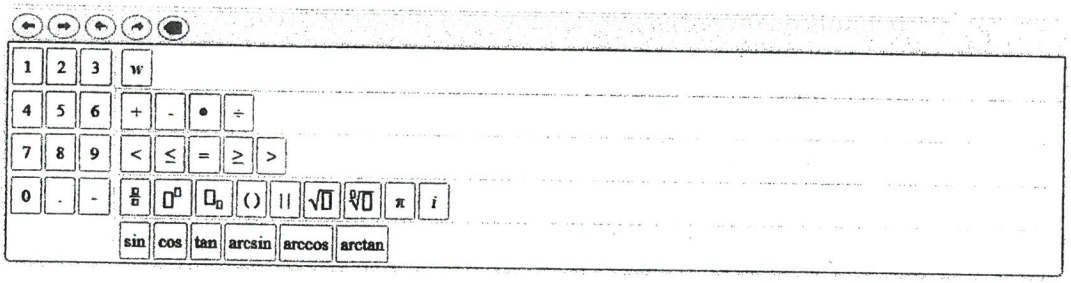
(C) An increase in cars causes a decrease in hot dog sales.

(D) An increase in cars causes an increase in hot dog sales.

21

A rectangular park has an area of 250 square feet. The length of the park is 7 feet more than twice the width, w, of the park.

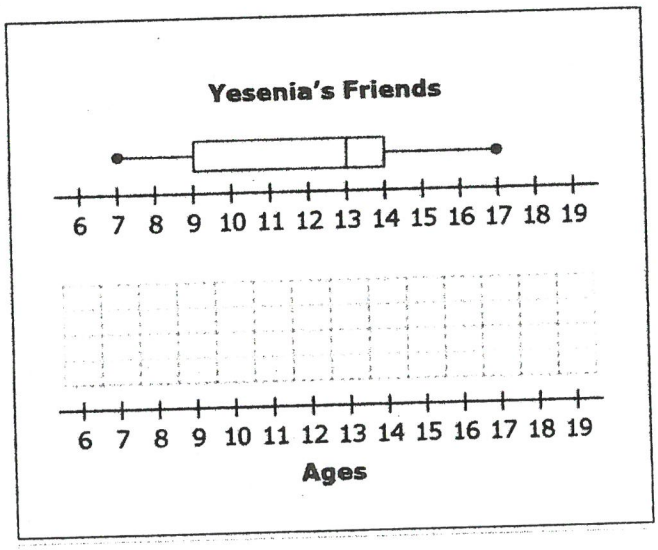
Create an equation in terms of w to model this situation.



23

Yesenia records the ages of 9 friends. A box plot of her data set is shown.

Click above the number line to create a dot plot that could represent Yesenia's data set.



24

An expression is shown.

$64x^2 - 196$

Michael rewrites this expression in a different form.

Which form could Michael have used, where a and b are integers?

(A) $(ax - b)^2$

(B) $(ax + b)^2$

(C) $(ax + b)(ax - b)$

(D) $(ax + b)(bx - a)$

Algebra Practice Answer Key

1. C
2. $2x + 1.5y = 12$
   3
3. 5
4. Distributive Property
   Commutative Property of Addition
   Associative Property of Addition
5. A
6. C
7. A
8. 1.45
   2.6
9. $(x^2+12)(x^2-12)$
10. X-3
    0
11. C
12. $(x+8)^2+ 80$
13. 2
    8
14. -12
15. C
16. 324 75 399
    33 93 126
    357 168 525
17. C
18. D
19. .8
    -.9
20. B
21. $2w^2+7w=250$
22. 2^x-3
23. 1@7
    2@9
    3@13
    2@14
    1@17
24. C