



Algebra I

Sample Test Items

1. The capacity of a water tank is 1,000 gallons. Don uses a bucket that can hold 2 gallons to fill the tank. It takes him 3 minutes to fill the bucket with water and pour it into the tank.

Which expression represents how much time it takes to fill the tank?

- (A) $\frac{1 \text{ bucket}}{2 \text{ gallons}} \cdot \frac{3 \text{ minutes}}{1 \text{ bucket}} \div 1,000 \text{ gallons}$
- (B) $\frac{2 \text{ gallons}}{1 \text{ bucket}} \cdot \frac{1 \text{ bucket}}{3 \text{ minutes}} \div 1,000 \text{ gallons}$
- (C) $(1,000 \text{ gallons}) \cdot \frac{2 \text{ gallons}}{1 \text{ bucket}} \cdot \frac{3 \text{ minutes}}{1 \text{ bucket}}$
- (D) $(1,000 \text{ gallons}) \cdot \frac{1 \text{ bucket}}{2 \text{ gallons}} \cdot \frac{3 \text{ minutes}}{1 \text{ bucket}}$

- 2.** Kibi has a gift card to download songs. The expression $50 - 1.29s$ represents the balance of the gift card.

Which statements are true?

Select **two** answer choices.

- Ⓐ The value 1.29 represents the cost to download a song.
- Ⓑ The value 1.29 represents the initial value of the gift card.
- Ⓒ The value 50 represents the cost to download a song.
- Ⓓ The value 50 represents the initial value of the gift card.
- Ⓔ The value 50 represents the number of songs that can be downloaded.

3. Which expressions are equivalent to $x^2 + 6x - 27$?

Select **two** answer choices.

Ⓐ $(x + 3)(x + 9)$

Ⓑ $(x - 3)(x + 9)$

Ⓒ $(x + 6)(x - 27)$

Ⓓ $(x + 3)^2 - 36$

Ⓔ $(x + 3)^2 + 36$

4. What are the zeros of the function $f(x) = 9x^2 - 36$?

Select **two** answer choices.

Ⓐ -4

Ⓑ -2

Ⓒ 0

Ⓓ 2

Ⓔ 4

5. Taylor is moving into an apartment. He has to pay one month's rent, a security deposit, and a one-time utility fee of \$375. The security deposit is $\frac{2}{3}$ the amount of one month's rent.

Taylor paid a total of \$2,000 to move into the apartment. How much is his rent each month?

- Ⓐ \$541.67
- Ⓑ \$975.00
- Ⓒ \$1,200.00
- Ⓓ \$3,958.33

6. Team A won the first game of the season against Team B by 5 points. The two teams together scored a total of 13 points in the game. Let x represent the points scored by Team A and let y represent the points scored by Team B.

Which system of linear equations models the points scored by both Team A and Team B?

Ⓐ $y = x + 5$
 $x + y = 13$

Ⓑ $x = y - 5$
 $y = 13 - x$

Ⓒ $x = y + 5$
 $x + y = 13$

Ⓓ $y = x - 5$
 $x - y = 13$

7. A ring is a shape called an annulus. A formula for the area of an annulus is $A = \pi(x^2 - y^2)$, where x is the radius of the larger circle and y is the radius of the smaller circle. Which equation is solved for the larger radius of an annulus?

Ⓐ $x = \sqrt{A\pi + y^2}$

Ⓑ $x = \sqrt{\frac{A}{\pi} + y^2}$

Ⓒ $x = \sqrt{\frac{A}{\pi} - y^2}$

Ⓓ $x = \sqrt{\frac{A + y^2}{\pi}}$

8. Select the boxes that identify the property used in each step involved in solving the equation $4x - 5x = \frac{1}{2}(4x + 8)$.

	$-x = \frac{1}{2}(4x + 8)$	$-x = 2x + 4$	$-3x = 4$	$x = -\frac{4}{3}$
Distributive Property	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Commutative Property	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Subtraction Property of Equality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Division Property of Equality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Combine like terms	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Associative Property	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. Shannon wants to solve the equation by completing the square.

$$x^2 - 14x = 10$$

What values complete the equation?

Write the answer in the boxes.

$$(x - \boxed{})^2 = \boxed{} + 10$$

10. The graph of the equation $y = \frac{-9.8x^2}{2}$ represents the position of a falling object with respect to time. Let y represent the position of the object, measured in meters, and x represent time, measured in seconds.

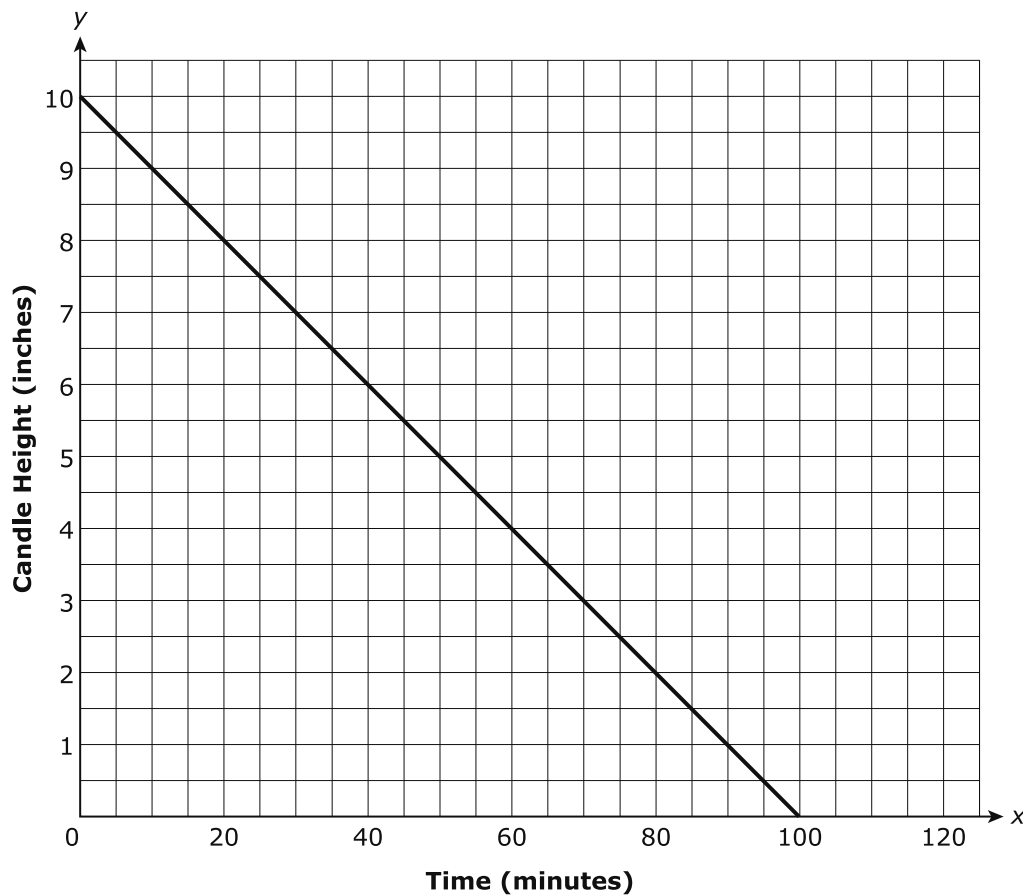
Which ordered pairs represent points that are on the graph?

Select **two** answer choices.

- Ⓐ (0, 0)
- Ⓑ (1, -4.4)
- Ⓒ (2, -9.8)
- Ⓓ (3, -44.1)
- Ⓔ (4, -39.05)

- 11.** The arithmetic sequence $2, 8, 14, 20, \dots$ can be represented by the equation $a_n = 6n - 4$. What is the domain of the arithmetic sequence?
- Ⓐ all real numbers
 - Ⓑ all positive real numbers
 - Ⓒ integers greater than or equal to 1
 - Ⓓ integers greater than or equal to 20

12. The function $f(t) = -\frac{1}{10}t + 10$ represents the height of a candle as it burns for t minutes. The function is modeled by the graph.



Which statement describes the domain of the function?

- (A) The domain of the function includes all real numbers.
- (B) The domain of the function includes all numbers where $t \geq 0$.
- (C) The domain of the function includes all real numbers where $0 \leq t \leq 100$.
- (D) The domain of the function includes all whole numbers where $0 \leq t \leq 100$.

13. Mack agreed to help the prom committee inflate balloons. The table lists the number of balloons, B , he inflated after n hours.

Time (hours)	Number of Balloons
1	125
2	247
3	342
4	431
5	581

For which time interval did Mack have the fastest average rate of change?

- Ⓐ between 1 hour and 2 hours
- Ⓑ between 1 hour and 3 hours
- Ⓒ between 2 hours and 4 hours
- Ⓓ between 2 hours and 5 hours

14. Given the function $f(x) = -x^2 + 2x + 3$, which form reveals the zeros of $f(x)$?

Ⓐ $f(x) = (x - 1)(x + 3)$

Ⓑ $f(x) = (x - 1)^2 + 4$

Ⓒ $f(x) = -(x + 1)(x - 3)$

Ⓓ $f(x) = -(x - 1)^2 + 4$

15. Which term describes each function?

Select the correct box for each function.

	Odd	Even	Neither
$f(x) = (x + 4)^3 - 2$	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
$f(x) = \frac{1}{x}$	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
$f(x) = -x^2 - 7x + 2$	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
$f(x) = -3 x + 5$	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

16. The table shows the height of a flower for five consecutive weeks after it was planted.

Week	Height (inches)
0	3.0
1	3.5
2	4.0
3	4.5
4	5.0
5	5.5

Which function represents the situation modeled in the table?

- Ⓐ the exponential function $y = \left(\frac{1}{2}\right)^x + 3$ because the function grows by equal factors
- Ⓑ the linear function $y = \frac{1}{2}x + 3$ because the function grows by equal factors
- Ⓒ the exponential function $y = \left(\frac{1}{2}\right)^x + 3$ because the function grows by equal differences
- Ⓓ the linear function $y = \frac{1}{2}x + 3$ because the function grows by equal differences

17. A large lake was stocked with trout ten years ago. The change in the trout population each year is modeled by the function $P(x) = 8,500(0.88)^x$. Which statement describes 0.88 in the function?

- Ⓐ The amount of fish will increase exponentially over time by 12% each year.
- Ⓑ The amount of fish will decrease exponentially over time by 12% each year.
- Ⓒ The amount of fish will increase exponentially over time by 88% each year.
- Ⓓ The amount of fish will decrease exponentially over time by 88% each year.

18. The results of a student survey on the favorite milkshake flavor are shown.

	Males	Females	Total
Vanilla	68	32	100
Chocolate	54	106	160
Strawberry	75	65	140
Total	197	203	400

What is the **approximate** percentage of female students who chose chocolate as their favorite milkshake flavor?

- Ⓐ 27%
- Ⓑ 50%
- Ⓒ 52%
- Ⓓ 66%

19. Devon is training for a marathon. His training schedule for the number of miles he wants to run each week, y , is represented by the function $y = \frac{11}{6}x + \frac{8}{3}$, where x represents the number of weeks. The table shows the number of miles that Devon ran each week for the first ten weeks.

Miles Run per Week

Week	1	2	3	4	5	6	7	8	9	10
Miles	5.5	6.0	7.3	9.8	12.0	12.75	15.5	17.0	19.6	21.0

Which residual plot represents Devon's training for the marathon?

Ⓐ

x	1	2	3	4	5	6	7	8	9	10
Residual	1.0	-0.33	-0.87	-0.2	0.17	-0.92	0.0	-0.33	0.43	0.0

Ⓑ

x	1	2	3	4	5	6	7	8	9	10
Residual	-1.0	0.33	0.87	0.2	-0.17	0.92	0.0	0.33	-0.43	0.0

Ⓒ

x	1	2	3	4	5	6	7	8	9	10
Residual	5.5	6.0	7.3	9.8	12.0	12.75	15.5	17.0	19.6	21.0

Ⓓ

x	1	2	3	4	5	6	7	8	9	10
Residual	4.5	6.34	8.17	10.0	11.83	13.67	15.5	17.33	19.17	21.0

20. The table shows the height, x , in inches, of nine people and the corresponding length, y , in inches, from hip to knee for each individual.

Hip to Knee Length

x	y
69.5	43.7
63.4	36.0
72.4	45.4
67.4	40.0
70.1	43.5
64.4	41.0
68.3	39.8
68.3	42.1
65.6	36.0

Which statements are true for the set of data?

Select **two** answer choices.

- Ⓐ The data shows a weak correlation.
- Ⓑ The data shows a strong correlation.
- Ⓒ The data represents a negative correlation.
- Ⓓ The correlation coefficient is approximately 0.85.
- Ⓔ The correlation coefficient is approximately -0.25 .

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Algebra Sample Test Items
Paper-Pencil Answer Key Document

Sequence	Key	Standard	Possible Points
1	D	N-Q.1	1
2	A,D	A-SSE.1	1
3	B,D	A-SSE.2	1
4	B,D	A-SSE.3	1
5	B	A-CED.1	1
6	C	A-CED.3	1
7	B	A-CED.4	1
8	2,11,16,17	A-REI.1	1
9	7,49	A-REI.4	1
10	A,D	A-REI.10	1
11	C	F-IF.3	1
12	C	F-IF.5	1
13	A	F-IF.6	1
14	C	F-IF.8	1
15	3,4,9,11	F-BF.3	2
16	D	F-LE.1	1
17	B	F-LE.5	1
18	C	S-ID.5	1
19	A	S-ID.6	1
20	B,D	S-ID.8	1