

SAT Practice Worksheet

Linear Functions & Algebraic Reasoning · 25 Questions

Name: _____ Date: _____ Score: _____ / 25

Directions: Choose the best answer for each multiple-choice question. For grid-in questions, write your answer in the box provided.

SECTION 1 — Multiple Choice

1. A plumber charges \$85 for the first hour of work plus \$60 for each additional hour. The total cost for h hours of work is \$265. Which function C gives the total cost, in dollars, for h hours of work, where $h > 1$?

- A. $C(h) = 60h + 85$
 - B. $C(h) = 60h + 25$
 - C. $C(h) = 85h + 60$
 - D. $C(h) = 145h$
-

2. A car rental company charges \$45 per day plus a one-time insurance fee of \$30. If Maria rents a car for d days, which of the following represents the total cost, in dollars?

- A. $T = 30d + 45$
 - B. $T = 45d + 30$
 - C. $T = 75d$
 - D. $T = 45 + 30d$
-

3. An economist modeled the demand Q for a product as a linear function of the selling price P . The demand was 30,000 units when the price was \$50, and the demand was 24,000 units when the price was \$80. Based on the model, what is the demand, in units, when the selling price is \$65?

- A. 26,000
 - B. 27,000
 - C. 27,500
 - D. 28,000
-

4. The table shows two values of x and their corresponding values of $f(x)$ for a linear function f . What is the x -intercept of the graph of $y = f(x)$?

x	$f(x)$	
2	11	
5	5	

- A. (7, 0)
- B. (7.5, 0)
- C. (8, 0)

D. (9, 0)

5. The cost of renting a pressure washer is \$120 for the first day and \$65 for each additional day. Which of the following equations gives the cost y , in dollars, of renting the pressure washer for x days, where x is a positive integer and $x \leq 8$?

- A. $y = 65x + 55$
 - B. $y = 65x + 120$
 - C. $y = 120x + 65$
 - D. $y = 120x - 65$
-

6. Oil reserves in a region dropped from 8.5 million barrels in 2005 to 5.2 million barrels in 2018. Assuming the decline was constant, which linear function f best models the reserves, in millions of barrels, t years after 2005?

- A. $f(t) = -0.254t + 8.5$
 - B. $f(t) = 0.254t + 8.5$
 - C. $f(t) = -0.330t + 8.5$
 - D. $f(t) = -3.3t + 8.5$
-

7. The function h is defined as $h(x) = f(x) + g(x)$, where $f(x) = \frac{1}{3}x - 12$ and $g(x) = \frac{2}{3}x + 18$. What is the x -coordinate of the x -intercept of the graph of $y = h(x)$?

- A. -6
 - B. 0
 - C. 6
 - D. 18
-

8. For groups of 30 or more, a science museum charges \$18 per person for the first 30 people and \$12 for each additional person. Which function f gives the total charge, in dollars, for a group with n people, where $n \geq 30$?

- A. $f(n) = 12n + 180$
 - B. $f(n) = 12n + 540$
 - C. $f(n) = 12n + 360$
 - D. $f(n) = 30n - 360$
-

9. The average monthly temperature T , in degrees Fahrenheit, in a certain city is modeled by $T(m) = 3.4m + 28.6$, where m is the number of months after January 1. The constant 28.6 in this function best represents which of the following?

- A. The average monthly increase in temperature
 - B. The average temperature in January
 - C. The average temperature in December
 - D. The total increase in temperature over 12 months
-

10. A painter charges \$150 for the first room and \$95 for each additional room. If a customer paid a total of \$530, how many rooms were painted?

- A. 3
 - B. 4
 - C. 5
 - D. 6
-

11. The linear function p is defined by $p(x) = ax + b$. The graph passes through $(2, 7)$ and $(6, 19)$. What is the value of $a + b$?

- A. 1
 - B. 2
 - C. 4
 - D. 7
-

12. Each liter of paint covers 9 square meters of wall. A room has a total wall area of W square meters. Which equation represents the total number of liters of paint P needed to paint the room three times?

- A. $P = W / 27$
 - B. $P = 3W / 9$
 - C. $P = 27 / W$
 - D. $P = W + 27$
-

13. The table shows three values of x and their corresponding values of $f(x)$ for a linear function f , defined by $f(x) = cx + d$. If $f(cx) = 4cx + d$, which equation defines f ?

x	$f(x)$	
0	-3	
4	9	

- A. $f(x) = 3x - 3$
 - B. $f(x) = 3x + 3$
 - C. $f(x) = -3x + 3$
 - D. $f(x) = 4x - 3$
-

14. A spring's length L , in centimeters, is modeled by $L = 4w + 15$, where w is the weight in kilograms attached to the spring. Which of the following describes the meaning of the constant 15 in this context?

- A. The length of the spring increases by 15 cm for each kilogram added
 - B. The length of the spring with no weight attached
 - C. The maximum weight the spring can hold
 - D. The weight needed to stretch the spring 4 centimeters
-

15. The linear function g is defined by $g(x) = k - 8x$, where k is a constant. If $g(m + 4) = m/3$, where m is a constant, which of the following expressions represents the value of k ?
- A. $8m/3$
 - B. $25m/3 + 4$
 - C. $m/3 + 32$
 - D. $25m/3 + 32$
-

SECTION 2 — More Multiple Choice

16. A taxi service charges \$3.50 for the first mile and \$1.75 for each additional mile. Which of the following equations gives the cost y , in dollars, for a trip of x miles, where x is a positive integer?
- A. $y = 1.75x + 1.75$
 - B. $y = 3.50x + 1.75$
 - C. $y = 1.75x + 3.50$
 - D. $y = 1.75x - 3.50$
-

17. A scientist recorded the temperature of a cooling liquid. At 10 minutes, the temperature was 85°C . At 25 minutes, the temperature was 55°C . Assuming linear cooling, what was the temperature at 0 minutes?
- A. 95°C
 - B. 100°C
 - C. 105°C
 - D. 110°C
-

18. The function f is defined as 6 more than 4 times a number n . If the graph of $y = f(n)$ is drawn in the xy -plane, what is the best interpretation of the n -intercept?
- A. When $f(n) = 0$, the number is $-3/2$
 - B. When the number is 0, $f(n) = 6$
 - C. The value of $f(n)$ increases by 6 for each increase of 4 in n
 - D. For each increase of 4 in n , $f(n)$ increases by 6
-

19. A caterer charges \$250 for setup plus \$18 per guest. Another caterer charges a flat rate of \$22 per guest with no setup fee. For how many guests would the two caterers charge the same total amount?
- A. 52
 - B. 60
 - C. 62.5
 - D. 65
-

20. In the xy -plane, the graph of $3x - 5y = 20$ and the graph of $y = kx - 4$ are parallel. What is the value of k ?
- A. $3/5$

- B. $-\frac{3}{5}$
- C. $\frac{5}{3}$
- D. $-\frac{5}{3}$

21. Jasmine used 2.5 yards of fabric for each costume she made for a school play. The total fabric T , in yards, she purchased is represented by the equation $T = 2.5c + 3$, where c is the number of costumes. What is the best interpretation of the constant 3 in this context?

- A. Jasmine made 3 costumes
- B. Jasmine purchased 3 extra yards of fabric beyond what she used for costumes
- C. Each costume required 3 additional yards
- D. Jasmine used a total of 3 yards for all costumes

22. The table shows values of x and $f(x)$ for a linear function. What is the x -intercept of the graph of $y = f(x)$ in the xy -plane?

x	$f(x)$	
-3	15	
1	7	

- A. (5, 0)
- B. (5.5, 0)
- C. (8, 0)
- D. (10, 0)

23. A factory produced 12,000 units in 2010. The production increased at a constant rate of 850 units per year. In which year did production first exceed 20,000 units?

- A. 2018
- B. 2019
- C. 2020
- D. 2021

SECTION 3 — Grid-In (Enter your answer in the box)

24. The functions f and g are defined as $f(x) = \frac{1}{2}x - 10$ and $g(x) = \frac{3}{2}x + 14$. If the function h is defined as $h(x) = f(x) + g(x)$, what is the x -coordinate of the x -intercept of the graph of $y = h(x)$?

Answer: _____

25. For the linear function f , the table below shows three values of x and their corresponding values of $f(x)$. Function f is defined by $f(x) = ax + b$, where a and b are constants. What is the value of $a - b$?

x	$f(x)$	
-----	--------	--

1	8	
4	17	

Answer: _____