Piecewise Functions Practice

Choose one answer per question. Circle A, B, C, or D.

1. A function uses $f(x) = x + 6$ if $x < 2$ and $f(x) = 3x$ if $x \geq 2$. What is $f(-2)$?
   A. 4
   B. −6
   C. 8
   D. 6

2. The rule is $g(x) = 8 - x$ for $x \leq 3$ and $g(x) = 2x + 1$ for $x > 3$. What is $g(3)$?
   A. 8
   B. 7
   C. 5
   D. 11

3. A graph uses $p(x) = 6 - x$ for $x < 4$ and $p(x) = x + 1$ for $x \geq 4$. Which point on the graph is filled at $x = 4$?
   A. (4, 2)
   B. (4, 5)
   C. (5, 4)
   D. (4, 4)

4. A function uses $h(x) = x - 2$ for $x < 0$, $h(x) = 4$ for $x = 0$, and $h(x) = x + 2$ for $x > 0$. What are $h(-2)$, $h(0)$, and $h(2)$, in order?
   A. −4, −2, 4
   B. −4, 2, 4
   C. 0, 4, 0
   D. −4, 4, 4

5. A table pairs x-values 0, 1, 2, 3, 4, and 5 with outputs 2, 2, 2, 5, 5, and 8 in that order. The table lists every allowed input. Which condition selects exactly the inputs with output 5?
   A. $2 \leq x \leq 4$
   B. $3 \leq x \leq 4$
   C. $3 \leq x \leq 5$
   D. $2 < x < 4$

6. A fictional game library charges $5 for up to 2 hours, plus $3 per hour beyond 2 hours. Extra time is billed proportionally, including fractions of an hour. What does a 4.5-hour rental cost?

A. $12.50
B. $13.50
C. $18.50
D. $11.00

7. A fictional print shop charges $0.90 each for the first 12 posters and $0.60 for each poster beyond 12. If n is the number of posters and n > 12, which expression gives the total cost in dollars?

A. 0.90n + 0.60(n − 12)
B. 0.60n
C. 10.80 + 0.90(n − 12)
D. 10.80 + 0.60(n − 12)

8. A function uses r(t) = t + 2 for $-3 \le t < 1$ and r(t) = 2t for $2 < t \le 6$. It has no other rules. What is its domain?

A. $(-3, 1] \cup [2, 6)$
B. $[-3, 6]$
C. $[-3, 1) \cup (2, 6]$
D. $[-3, 1] \cup [2, 6]$

9. A function uses s(x) = x + 4 for $-2 \le x < 1$ and s(x) = 7 for $1 \le x \le 4$. It has no other rules. What is its range?

A. $[2, 5) \cup \{7\}$
B. $[2, 5] \cup \{7\}$
C. $[2, 7]$
D. $(2, 5] \cup \{7\}$

10. A function uses f(x) = x + 1 for $x < 2$, f(x) = 3 for $2 \le x < 5$, and f(x) = x + 2 for $x \ge 5$. At which boundary do the two sides approach different values?

A. Neither boundary
B. x = 2 only
C. Both x = 2 and x = 5
D. x = 5 only

11. A function uses $f(x) = 4 - x$ for $x < 0$, $f(x) = 1$ for $0 \le x < 3$, and $f(x) = 2x - 4$ for $x \ge 3$. Which inputs give $f(x) = 6$?

A. 5 only
B. -2 only
C. -2 and 5
D. 2 and 5

12. The rule is $f(x) = 3x + b$ for $x < 2$ and $f(x) = x^2 + 4$ for $x \ge 2$. Which value of b makes the graph continuous at $x = 2$?

A. 14
B. 2
C. 4
D. -2

13. A function uses $p(x) = x + 5$ for $x < 2$ and $p(x) = 2x - 5$ for $x \ge 2$. For which inputs is $p(x) > 3$?

A. $(-2, \infty)$
B. $[-2, 2) \cup [4, \infty)$
C. $(-2, 4)$
D. $(-2, 2) \cup (4, \infty)$

14. A fictional exhibit's Plan A charges $18 for up to 6 visitors plus $2 per additional visitor. Plan B charges $3 per visitor for groups of 1 to 10 and a flat $30 for 11 or more. For which positive whole-number group sizes is A cheaper?

A. 7 through 11
B. 6 through 12
C. 7 through 12
D. 7 and up

15. A game first computes $y = f(x)$, where $f(x) = x + 4$ for $x < 3$ and $f(x) = 2x - 1$ for $x \ge 3$. The final score is $g(y) = y$ for $y < 6$ and $g(y) = 12 - y$ for $y \ge 6$. Which real inputs x earn a final score of 5?

A. 3 and 4 only
B. 1 and 4 only
C. 1, 3, and 4
D. 1 and 3 only