

Advanced Function Reasoning

Foundation to Challenge

Practice should make the test feel easier, not merely familiar.

Work without the answer key first. Check answers through the SAT Practice Library after completing the set.

STANDARD

- 1 If $f(x-2)=5x+1$ and $g(x)=x-4$, what is $f(g(7))$?

ADVANCED

- 2 Which graph behavior is possible for $y=x^3-x^2-2x+2$?
- A. left down, right up, with three real x-intercepts possible
 - B. left up, right down, no real intercept
 - C. both ends up
 - D. both ends down

FOUNDATION

- 3 Function f reaches a maximum at $(4, f(4))$. If $g(x)=f(x)-6$, where does g reach its maximum?
- A. $(10, f(10)-6)$
 - B. $(f(4), f(4)-6)$
 - C. $(4, f(10))$
 - D. $(4, f(4)-6)$

STANDARD

- 4 Line f has slope $\frac{2}{5}$. A perpendicular line h intersects f at $(2, 3)$. What is $h(-3)$?

- 5 A line $f(x) = -2x + 5$ is shifted upward 6 units to form g . What is the x-intercept of g ?

FOUNDATION

- 6 A table gives $f(-3)=2$, $f(-1)=5$, $f(2)=7$, $f(4)=3$. If $g(x)=3f(x)$, for which x does $g(x)=9$?

ADVANCED

- 7 $f(x) = -a^{x+b}$. The graph of $y = f(x) - 8$ has y-intercept -11 , and $ab = -8$. What is a ?

FOUNDATION

- 8 Let $f(x) = x^3$. If $g(x) = f(x+2) - 3$, what are the coordinates of the inflection point of g ?

ADVANCED

- 9 Line $y = mx - m$ forms a triangle with the coordinate axes in quadrant IV when $m > 0$. What is the area of the triangle?

- A. $\frac{m}{2}$
- B. m
- C. $\frac{m^2}{2}$
- D. m^2

- 10 The graph of $y = -g(x)$ passes through the origin and always has positive slope. If g is exponential, which could define g ?

- A. $g(x) = 1 - 2^x$
- B. $g = -\left(\frac{3}{4}\right)^{x+1}$
- C. $g = \left(\frac{2}{5}\right)^{x+1}$
- D. $g = 3^x$

CHALLENGE

- 11 For $H(x) = 1 - \frac{1}{x}$, $x \neq 0$, which identity is true?

- A. $H(x) - H\left(\frac{1}{x}\right) = x^2 H\left(\frac{1}{x^2}\right)$
- B. $H(x) - H\left(\frac{1}{x}\right) = x H(x^2)$
- C. $H(x) + H\left(\frac{1}{x}\right) = x H\left(\frac{1}{x^2}\right)$
- D. Both B and C

12 A parabola $y = mx^2 + nx + p$ opens upward, has a negative x-coordinate for its vertex, and a positive y-intercept. Which statement cannot be forced from this information alone?

A. $m > 0$

B. $n < 0$

C. $p > 0$

D. $-\frac{n}{2m} < 0$

FINISHED?

Check your answers online

aryalanupme.github.io/sat-advanced-functions.html

Do not stop at “wrong.” Identify why it was wrong: concept, algebra, arithmetic, interpretation, calculator choice, or timing.

I do not correct the answer first. I correct the reason.

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