

Parabolas & Quadratic Models

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.

FOUNDATION

1 A parabola is defined by $y = 3x^2 - 12x + 7$. What is its vertex?

- A. $(2, -5)$
- B. $(-2, 7)$
- C. $(2, -7)$
- D. $(4, -5)$

STANDARD

2 What is the y-coordinate of the vertex of $y = 2x^2 - 8x + 1$?

FOUNDATION

3 What is the distance between the x-intercepts of $y = x^2 - 5x - 14$?

4 For what value of t does $v = 12t - 2t^2$ attain its maximum?

- 5 For $f(x) = -5x^2 + 20x - 11$, at what x -value does f attain its maximum?

STANDARD

- 6 A ball is launched from a 2-meter platform. Its height is $h(t) = -5t^2 + 18t + 2$. What maximum height does it reach?

- 7 A shop models daily profit by $P(x) = -4x^2 + 96x - 300$. How many units maximize profit?

ADVANCED

- 8 A company models monthly profit by $P = m^2 - 100m - 9600$. What is the least positive number of units m needed to break even?

FOUNDATION

- 9 The cost per unit is modeled by $f(x) = x^2 - 18x + 120$. How many units minimize the cost?

STANDARD

- 10** An object has height $h(t) = -4t^2 + 16t + 20$. How many seconds after launch does it hit the ground?

FOUNDATION

- 11** Which equation has vertex $(4, -6)$ and opens upward with vertical stretch factor 2?

- A. $y = 2(x - 4)^2 - 6$
 B. $y = (x + 4)^2 - 6$
 C. $y = -2(x - 4)^2 - 6$
 D. $y = 2(x + 4)^2 + 6$

STANDARD

- 12** For $f(x) = m[(x - m)^2 - 2]$, where $m > 0$, which statement is true?

- A. minimum at $(m, -2)$
 B. minimum at $(m, -2m)$
 C. maximum at $(m, -2)$
 D. maximum at $(m, -2m)$

ADVANCED

- 13** The line $y = 3x + b$ intersects $y = x^2 + bx + 7$ at $x = 2$. What is the y-coordinate of the intersection?

CHALLENGE

- 14** The parabola $y = a(x - 1)(x - k)$ has vertex $(4, -27)$. What is a ?

FINISHED?

Check your answers online

aryalanupme.github.io/sat-parabolas-quadratic-models.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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