

SAT Quadratic Functions Worksheet

Name: _____ Date: _____

Circle one answer for each question. Use the blank space for calculations. A calculator is allowed.

1. For $f(x) = (x - 3)^2 + 5$, what is the minimum value of $f(x)$?

- A. 5
- B. 8
- C. 3
- D. 9

2. What are the zeros of $f(x) = (x + 2)(x - 7)$?

- A. -2 and -7
- B. 2 and -7
- C. -2 and 7
- D. 2 and 7

3. What is the y-intercept of the graph $y = 2(x - 4)^2 - 3$?

- A. (0, -3)
- B. (4, -3)
- C. (0, 13)
- D. (0, 29)

4. The height h , in meters, of a modeled object t seconds after launch is $h(t) = -5t^2 + 20t + 1$. What is its maximum height?
- A. 16 meters
 - B. 21 meters
 - C. 2 meters
 - D. 20 meters
5. A quadratic has zeros 1 and 5 and passes through (0, 10). Which equation represents it?
- A. $y = 2(x - 1)(x - 5)$
 - B. $y = 2(x + 1)(x + 5)$
 - C. $y = 10(x - 1)(x - 5)$
 - D. $y = (x - 1)(x - 5)$
6. If $f(x) = x^2 - 8x + 11$, what is the minimum value of f ?
- A. -4
 - B. 11
 - C. -5
 - D. -8

7. The function $f(x) = -2(x + 1)^2 + 8$ has its maximum at which value of x ?

- A. -2
- B. -1
- C. 1
- D. 8

8. For $f(x) = x^2 - 6x + 8$, what is the smaller zero?

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

9. A quadratic function has vertex $(2, 3)$ and passes through $(4, 11)$. What is $f(0)$?

- A. 3
- B. 7
- C. 11
- D. 19

10. If $g(x) = (x - 5)^2 - 9$, what is the positive difference between its two zeros?

- A. 3
- B. 5
- C. 6
- D. 9

11. A rectangle has perimeter 40 meters. If its width is x meters, its area is $A(x) = x(20 - x)$. What is its greatest possible area?

- A. 40 square meters
- B. 80 square meters
- C. 100 square meters
- D. 400 square meters

12. If $f(x) = 3x^2 + bx + 7$ and the axis of symmetry is $x = 2$, what is b ?

- A. -12
- B. -6
- C. 6
- D. 12

Answer key

1 **A** · 2 **C** · 3 **D** · 4 **B** · 5 **A** · 6 **C** · 7 **B** · 8 **C** · 9 **C** · 10 **C** · 11 **C** · 12 **A**

1. A: 5

A square is nonnegative. Its smallest value is 0, attained at $x = 3$. Therefore the minimum output is 5, not the x -coordinate 3.

2. C: -2 and 7

Set each factor equal to zero: $x + 2 = 0$ gives -2 , and $x - 7 = 0$ gives 7 .

3. D: (0, 29)

At the y -intercept $x = 0$. Then $y = 2(16) - 3 = 29$, so the point is $(0, 29)$. The vertex is $(4, -3)$.

4. B: 21 meters

The vertex occurs at $t = -\frac{20}{2(-5)} = 2$. Evaluate $h(2) = -20 + 40 + 1 = 21$ meters. The time 2 is not the requested height.

5. A: $y = 2(x - 1)(x - 5)$

The zeros imply $y = a(x - 1)(x - 5)$. At $x = 0$, $10 = 5a$, so $a = 2$.

6. C: -5

Complete the square: $x^2 - 8x + 11 = (x - 4)^2 - 5$. The minimum output is -5 , attained at $x = 4$.

7. B: -1

The negative coefficient makes the parabola open downward. Its vertex is $(-1, 8)$, so the maximizing input is $x = -1$.

8. C: 2

Factor $f(x)$ as $(x - 2)(x - 4)$. The zeros are 2 and 4, and the smaller is 2.

9. C: 11

Use $f(x) = a(x - 2)^2 + 3$. Since $11 = 4a + 3$, $a = 2$. Then $f(0) = 2(4) + 3 = 11$.

10. C: 6

Set $(x - 5)^2 = 9$. The roots are $x = 2$ and $x = 8$, whose positive difference is 6.

11. C: 100 square meters

$A(x) = -x^2 + 20x = -(x - 10)^2 + 100$. The maximum is 100 square meters when both sides are 10 meters.

12. A: -12

For $ax^2 + bx + c$, the axis is $x = -\frac{b}{2a}$. Set $2 = -\frac{b}{6}$ to obtain $b = -12$.