ILLAWARRA TUTORING

In this worksheet you will practise determining the equation of a quadratic function based on its key characteristics such as the vertex and one or more additional points. Work through each question carefully and show all your working.

Easy Questions

1. Find the quadratic equation in vertex form if the vertex is $(2, 3)$ and the graph passes through $(3, 5)$.

2. Find the quadratic equation in vertex form given that the vertex is $(-1, 2)$ and the graph passes through $(0, 3)$.

3. Determine the quadratic equation in vertex form if the vertex is $(0, -4)$ and the function passes through $(2, 0)$.

4. Write down the quadratic equation in vertex form with vertex $(3, -2)$ and a y-intercept at $(0, 10)$.

5. Find the quadratic equation in vertex form for a function with vertex $(-2, 0)$ that passes through $(-1, 2)$.

Intermediate Questions

6. Find the quadratic equation in vertex form if the vertex is $(1, 2)$ and the curve passes through $(2, 5)$.

7. Determine the quadratic equation in vertex form given that the vertex is $(4, -1)$ and the graph goes through $(5, 0)$.

8. Write the quadratic equation in vertex form if it has vertex $(0, 0)$ and passes through $(2, 8)$.

9. Find the quadratic equation in vertex form given that the vertex is $(2, -3)$ and the function passes through $(4, 5)$.

10. Determine the quadratic equation in vertex form if its vertex lies on the line $x = -1$, with the vertex at $(-1, 4)$, and the graph passes through $(1, 0)$.

11. Given the quadratic function $f(x) = a(x - h)^2 + k$ with vertex $(3, 2)$ and $f(4) = 6$, find the value of a.

12. Find the constant a in the quadratic function $f(x) = a(x - 2)^2 + 7$ if $f(0) = 15$.

13. Determine the quadratic equation in vertex form with vertex $(-3, 1)$ that passes through $(-1, 9)$.

14. Find the values of a and c for the quadratic function $f(x) = a(x + 5)^2 + c$, given that its vertex is $(-5, c)$ and it passes through $(-4, 2)$.

    Find the quadratic equation in vertex form if the vertex is $(-5, -1)$ and the graph passes through $(-4, 2)$.

15. Determine the quadratic equation in vertex form for a parabola with vertex $(2, 3)$ and x-intercepts at $x = -1$ and $x = 5$.

16. A quadratic function is given in vertex form as $f(x) = a(x - 1)^2 + b$. Find a and b if the function passes through $(0, 4)$ and $(2, 0)$.

    A quadratic function is given by $f(x) = a(x - 1)^2 + b$. If $f(0) = 4$ and $f(3) = 7$, determine a and b.

17. Find the quadratic equation in vertex form if the vertex is $(0, 0)$ and the function passes through $(-2, 8)$.

18. Write the quadratic equation in vertex form with vertex $(-2, 4)$ and passing through $(1, -1)$.

19. Determine the quadratic equation in vertex form if the vertex is $(2, -2)$ and the graph passes through $(4, 6)$.

20. Find the quadratic equation in vertex form given that the vertex is $(-3, -5)$ and the function passes through $(0, 0)$.

Hard Questions

21. Find the quadratic equation in vertex form if the vertex is $(1, 2)$ and the graph passes through both $(2, 5)$ and $(0, 0)$. (Verify your answer using both points.)

    Find the quadratic equation in vertex form if the vertex is $(1, 2)$ and the graph passes through $(2, 5)$ and $(0, 5)$.

22. Determine the quadratic equation in vertex form if the vertex is $(-4, 3)$ and the graph passes through $(-2, 11)$.

23. Find the quadratic equation in vertex form given that the vertex is $(5, -2)$ and the graph contains the point $(7, 6)$.

24. Write the quadratic equation in vertex form if the vertex is $(-1, -3)$ and the graph passes through $(2, 9)$.

25. A quadratic function has vertex $(3, 4)$ and passes through $(4, 8)$. Find its equation in vertex form and then express it in standard form.

26. Determine the quadratic equation in vertex form if its vertex is $(-2, -6)$ and it passes through $(-4, 2)$. Then convert your answer to standard form.

27. Find the quadratic equation in vertex form with vertex $(6, 1)$ given that $f(8) = 17$, and express your answer in standard form.

28. Write the quadratic equation in vertex form if the vertex is $(-3, 2)$ and the graph passes through $(0, 11)$, then convert your answer to standard form.

29. Determine the quadratic equation in vertex form if the vertex is $(2, -5)$ and the function contains the point $(6, 11)$.

30. A quadratic function is given by $f(x) = a(x-h)^2 + k$. If its vertex is $(-1, 2)$ and it passes through both $(1, 10)$ and $(-3, 10)$, determine the values of a, h, and k. Then write the complete equation in standard form.