ILLAWARRA TUTORING

In this worksheet you will practise determining the equation of a quadratic function based on its key characteristics such as the vertex, x-intercepts and y-intercept. Use the given information to express the quadratic in a suitable form and solve for any unknown parameters.

## Easy Questions

1. The quadratic function has vertex $(1, -2)$ and passes through $(2, 0)$. Find its equation in vertex form.
2. The quadratic function has x-intercepts $(-2, 0)$ and $(4, 0)$ and a y-intercept $(0, 8)$. Determine its equation.
3. The quadratic function has vertex $(0, 2)$ and passes through $(2, 10)$. Find its equation in vertex form.
4. The quadratic function has a minimum at $(3, -1)$ and passes through $(0, 8)$. Determine its equation.
5. The quadratic function is written in the form $y = a(x - h)^2 + k$. Given that the vertex is $(-1, 4)$ and the function passes through $(-2, 1)$, find its equation.

## Intermediate Questions

6. The quadratic function has vertex $(4, -3)$ and passes through $(6, 5)$. Find its equation in vertex form.
7. The quadratic function has x-intercepts $(1, 0)$ and $(5, 0)$ and vertex $(3, 2)$. Find its equation.
8. The quadratic function has vertex $(2, -4)$ and passes through $(4, 0)$. Determine its equation.
9. The quadratic function has a y-intercept of $(0, 6)$ and vertex $(3, -2)$. Find its equation.
10. The quadratic function has its minimum at $(-2, 5)$ and passes through $(0, 9)$. Determine its equation.
11. The quadratic function has vertex $(1, -1)$ and passes through $(3, 7)$. Find its equation.

12. The quadratic function has x-intercepts $(-1, 0)$ and $(5, 0)$ and a vertex at $(2, 3)$. Determine its equation.

13. The quadratic function is expressed in vertex form. Given that its vertex is $(-3, 2)$ and it passes through $(0, 32)$, find its equation.

14. The quadratic function has a y-intercept of $(0, -10)$ and vertex $(2, 0)$. Find the equation of the function.

15. The quadratic function has x-intercepts $(3, 0)$ and $(7, 0)$ and passes through $(5, 6)$. Determine its equation.

16. The quadratic function has vertex $(4, 8)$ and passes through $(2, 0)$. Find its equation in vertex form.

17. The quadratic function has x-intercepts $(-2, 0)$ and $(6, 0)$ and passes through $(4, 12)$. Determine the equation of the quadratic.

18. The quadratic function has vertex $(0, -5)$ and passes through $(5, 20)$. Find its equation.

19. The quadratic function has vertex $(2, 3)$ and a y-intercept of $(0, 7)$. Determine its equation.

20. The quadratic function has x-intercepts $(1, 0)$ and $(-3, 0)$ and passes through $(0, 2)$. Find its equation.

## Hard Questions

21. The quadratic function has vertex $(3, -4)$ and passes through $(7, 12)$. Find its equation in standard form.

22. The quadratic function has roots that differ by 6 and has its vertex at $(4, 0)$. Determine its equation.

23. The quadratic function has vertex $(-2, 5)$ and passes through $(3, -5)$. Find its equation.

24. The quadratic function has vertex $(0, -2)$ and its x-intercepts are $r$ units apart with $r = 8$. Determine its equation.

25. The quadratic function has a repeated root at $(2, 0)$ and passes through $(5, 15)$. Find its equation.

26. The quadratic function is given in the form $y = a(x-h)^2+k$. If its vertex is $(-1, 3)$ and it passes through $(2, 27)$, determine the value of $a$ and write its equation.

27. The quadratic function has x-intercepts $(-4, 0)$ and $(8, 0)$ and its vertex lies on the y-axis. Determine its equation.

28. The quadratic function has x-intercepts $(a, 0)$ and $(b, 0)$ where $a < b$, its vertex is $(2, -3)$ and it is known that $a + b = 0$. Find the quadratic function.

29. The quadratic function has vertex $(3, 4)$ and the absolute difference between its roots is 6. Determine its equation.

30. The quadratic function has vertex $(-2, 3)$, a y-intercept of $(0, 11)$, and an axis of symmetry $x = -2$. Find its equation.