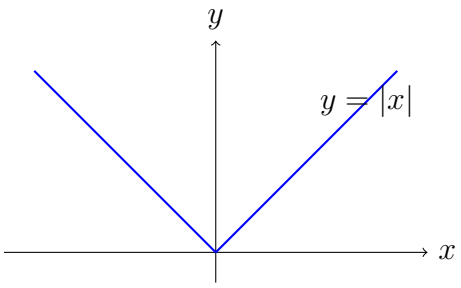
ILLAWARRA TUTORING

This worksheet will help you determine the domain and range of functions from given equations or graphs, ensuring that you understand all possible inputs and outputs.

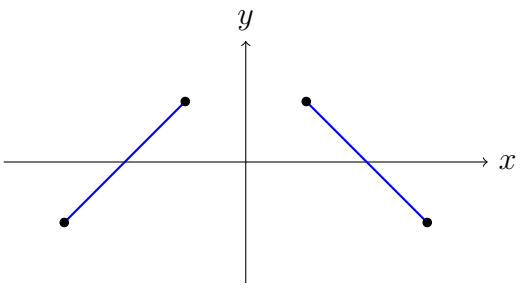
Easy Questions

1. Consider $f(x) = 5$. Write down the domain and the range of the function.
2. Consider $f(x) = x + 3$. Determine the domain and range of this function.
3. Consider $f(x) = x^2$. Find the domain and range of the function.
4. Consider $f(x) = \sqrt{x-2}$. Determine its domain and range.
5. Below is the graph of a function. Identify its domain and range.



Intermediate Questions

6. Consider $f(x) = \dfrac{1}{x-4}$. Determine its domain and range.
7. Consider $f(x) = \sqrt{9-x}$. Write down the domain and range of the function.
8. Consider $f(x) = \dfrac{1}{\sqrt{x}}$. Find the domain and range of this function.
9. Consider $f(x) = \dfrac{x^2-4}{x-2}$. Determine the domain and range of this function.
10. The graph below shows a function $f(x)$. Using the graph, state the domain and range.



11. Consider $f(x) = \dfrac{|x|}{x}$. Determine the domain and the range.
12. Consider $f(x) = \sqrt{1 - x^2}$. Find its domain and range.
13. Consider $f(x) = \sqrt[3]{x + 1}$. Write down the domain and range.
14. Consider $f(x) = \dfrac{1}{x^2 + 1}$. Determine the domain and range of this function.
15. Consider $f(x) = \sqrt{x - 3} + 2$. Find the domain and range.
16. Consider $f(x) = \dfrac{\sqrt{x}}{x - 1}$. State the domain and discuss any restrictions on the range.
17. Consider $f(x) = \sqrt{4 - x}$. Write down the domain and range of this function.
18. Consider $f(x) = \dfrac{x - 2}{x^2 - 4}$. Determine its domain and range.
19. A rectangular garden has its length given by $f(x) = x + 6$, where x is the width in metres. Considering that real garden dimensions must be positive, state the restrictions on x (the domain) and the corresponding range for the length.
20. Consider $f(x) = \sqrt{3x + 2} - 1$. Find the domain and range of this function.

Hard Questions

21. Consider $f(x) = \sqrt{x^2 - 4}$. Determine its domain and range.
22. Consider $f(x) = \dfrac{\sqrt{x - 1}}{\sqrt{5 - x}}$. Find the domain and range of this function.
23. Consider $f(x) = \dfrac{x^2 - 1}{\sqrt{x}}$. Determine the domain and justify your answer for the range.
24. Consider $f(x) = \dfrac{\sqrt{4x + 8}}{x - 2}$. State the domain and, by considering limits from the left and right of the discontinuity, discuss the range.
25. Consider $f(x) = \dfrac{x + 5}{x^2 + x - 6}$. Determine the domain and discuss how you would approach finding the range.

26. The function $f(x)$ is defined by

$$f(x) = \begin{cases} x^2, & x \leq 1, \\ 2x - 1, & x > 1. \end{cases}$$

Determine the domain and range of $f(x)$.

27. Consider $f(x) = \dfrac{\sqrt{x+2} - \sqrt{x-1}}{x}$. Find the domain and discuss the complexities in determining the range.

28. Consider $f(x) = \dfrac{1}{(x-1)^2}$. Determine its domain and range.

29. Consider $f(x) = \sqrt{x^2 + 2x + 1} - |x+1|$. Find the domain and range of this function.

30. Consider $f(x) = \sqrt{9 - x^2} - \sqrt{x}$. Determine its domain and range.