

Question 4

Sketch the graph of the function:

$$f(x) = \sqrt{x+2} - 1$$

Instructions: Identify the domain, range, intercepts, and transformations applied to the parent square root function. Then provide a sketch.

Question 4 - Solution

We are given:

$$f(x) = \sqrt{x+2} - 1$$

Step 1: Parent function: $f(x) = \sqrt{x}$

Transformations:

- Horizontal shift left by 2: $x \rightarrow x + 2$
- Vertical shift down by 1

Step 2: Domain:

$$x + 2 \geq 0 \Rightarrow x \geq -2 \Rightarrow \boxed{\text{Domain: } [-2, \infty)}$$

Step 3: Range: Since square root outputs ≥ 0 , and we subtract 1:

$$\boxed{\text{Range: } [-1, \infty)}$$

Step 4: Intercepts

- **Y-intercept:** $f(0) = \sqrt{2} - 1 \approx 0.414$
- **X-intercept:** Set $f(x) = 0 \Rightarrow \sqrt{x+2} = 1 \Rightarrow x+2 = 1 \Rightarrow x = -1$

Key Point: The graph starts at $(-2, -1)$

