

Question 1

Sketch the graph of the function below. Identify the domain, range, intercepts, asymptotes, and any transformations applied to a basic parent function.

$$f(x) = -\frac{1}{x-2} + 3$$

Instructions: Analyze the function using transformations of the reciprocal function $f(x) = \frac{1}{x}$.

Question 1 - Solution

We are given:

$$f(x) = -\frac{1}{x-2} + 3$$

Parent Function: $\frac{1}{x}$

Transformations:

- Horizontal shift right by 2
- Reflection over x-axis (due to the negative sign)
- Vertical shift up by 3

Domain: $(-\infty, 2) \cup (2, \infty)$

Range: $(-\infty, 3) \cup (3, \infty)$

Vertical Asymptote: $x = 2$

Horizontal Asymptote: $y = 3$

Y-intercept: $f(0) = \frac{7}{2}$

X-intercept: $f(x) = 0 \Rightarrow x = \frac{7}{3}$

