

1. Let  $f(x) = \frac{x^2 - 5x + 6}{x^2 - 3x}$ .

(a) Find  $f(3)$ .

(b) Find  $\lim_{x \rightarrow 3} f(x)$ .

Solution:

(a) We get  $0/0$ , so  $f(3)$  is undefined.

(b) We have

$$\begin{aligned}\lim_{x \rightarrow 3} f(x) &= \lim_{x \rightarrow 3} \frac{(x-3)(x-2)}{x(x-3)} \\ &= \lim_{x \rightarrow 3} \frac{x-2}{x} \\ &= \frac{1}{3}.\end{aligned}$$

2. Find  $\lim_{x \rightarrow 4^+} \frac{x(x-5)}{x^2(x-4)}$ .

Solution: We have

$$\lim_{x \rightarrow 4^+} \frac{x(x-5)}{x^2(x-4)} = \frac{4(-1)}{16(0^+)}$$

which indicates that the limit is  $-\infty$ .

3. Let  $f(x) = \begin{cases} 2x-1 & \text{if } x < 2 \\ 6-x^2 & \text{if } x \geq 2. \end{cases}$  Find  $\lim_{x \rightarrow 2^-} f(x)$ .

Since  $f(x) = 2x - 1$  for  $x < 2$ , we have that

$$\begin{aligned}\lim_{x \rightarrow 2^-} f(x) &= \lim_{x \rightarrow 2^-} 2x - 1 \\ &= 3.\end{aligned}$$