

## 2.5 examples

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### 2.5 examples

## Calculus AB, section 2.5

### Example 1

$$\begin{aligned} \text{Calculate } \lim_{x \rightarrow 3} \frac{x^2 - 4x + 3}{x^2 + x - 12} &= \frac{0}{0} = \frac{\cancel{(x-3)}(x-1)}{(x+4)\cancel{(x-3)}} \\ &= \frac{x-1}{x+4} = \frac{2}{7} \end{aligned}$$

Example 2 (The form  $\frac{\infty}{\infty}$ )

Calculate  $\lim_{x \rightarrow \frac{\pi}{2}} \frac{\tan x}{\sec x}$

$$\begin{array}{l} \cos x \cdot \frac{\sin x}{\cos x} \\ \hline \frac{1}{\cos x} \end{array}$$

=  $\sin x \rightarrow 1$

$$\sec x = \frac{1}{\cos x}$$

$$\cos \frac{\pi}{2} = 0$$

Example 3 (Multiplying by the conjugate)

$\frac{0}{0}$  Evaluate  $\lim_{x \rightarrow 4} \frac{\sqrt{x}-2}{x-4} \cdot \frac{\sqrt{x}+2}{\sqrt{x}+2} = \frac{\cancel{x-4}}{(\cancel{x-4})(\sqrt{x}+2)} = \frac{1}{\sqrt{x}+2}$

$\frac{\sqrt{x}-2}{(\sqrt{x}-2)(\sqrt{x}+2)} = \frac{1}{4}$

$\frac{0}{0}$  Evaluate  $\lim_{h \rightarrow 5} \frac{h-5}{\sqrt{h+4}-3} \cdot \frac{\sqrt{h+4}+3}{\sqrt{h+4}+3} = \frac{(\cancel{h-5})(\sqrt{h+4}+3)}{h+4-9} = \frac{1}{(h-5)}$

$= 6$

p. 97: 5, 6, 7, 16, 17, 19, 27, 28, 31

Example 4 (The form  $\infty - \infty$ )

Calculate  $\lim_{x \rightarrow 1} \frac{1}{x-1} - \frac{2}{x^2-1}$

Example 5 (Function is infinite but not indeterminate)

Calculate  $\lim_{x \rightarrow 2} \frac{x^2 - x + 5}{x - 2}$

Example 6 (Limit involving a symbolic constant)

Calculate  $\lim_{h \rightarrow 0} \frac{(h+a)^2 - a^2}{h}$