

## Exercises Set 4

Department: EE

Level: 2

Course: Math 105

Second Term of 1428/1429

---

---

### Exercise 1:

Find the following limits

$$\begin{aligned} & - \lim_{x \rightarrow 4^+} \frac{2-x}{(x-4)(x+2)} & - \lim_{x \rightarrow 4^-} \frac{2-x}{(x-4)(x+2)} & - \lim_{x \rightarrow 4} \frac{2-x}{(x-4)(x+2)} \\ & - \lim_{x \rightarrow -\infty} \frac{4x^2 - x}{2x^3 - 5} & - \lim_{x \rightarrow -\infty} \frac{x^4 - x}{x^3 - 5x^2 + 2} & - \lim_{x \rightarrow 2} 10 \\ & - \lim_{x \rightarrow +\infty} \sqrt[3]{\frac{16x+5}{2x-8}} & - \lim_{x \rightarrow 5} \sqrt{x^2 - 3x - 1} & - \lim_{x \rightarrow 0^-} \frac{x}{|x|} \\ & - \lim_{x \rightarrow 0^+} \frac{x}{|x|} & - \lim_{x \rightarrow 9} \frac{x-9}{\sqrt{x}-3} & \end{aligned}$$

### Exercise 2:

Let  $f(x) = \begin{cases} x-1 & \text{if } x \leq 3 \\ 3x-7 & \text{if } x > 3 \end{cases}$  find,

$$- \lim_{x \rightarrow 3^-} f(x) \quad - \lim_{x \rightarrow 3^+} f(x) \quad - \lim_{x \rightarrow 3} f(x)$$

### Exercise 3:

Find the limits.

$$- \lim_{x \rightarrow +\infty} \sqrt{x^2 + 3} - x \quad - \lim_{x \rightarrow 0^+} \left( \frac{1}{x} - \frac{1}{x^2} \right)$$

### Exercise 4:

Find the horizontal and vertical asymptotes of  $f(x) = \frac{x^2}{x^2 - 25}$

### Exercise 5:

Find the limits.

$$- \lim_{x \rightarrow +\infty} e^x + x \quad - \lim_{x \rightarrow +\infty} \frac{e^{2x} - 1}{e^x - 1} \quad - \lim_{x \rightarrow 0^+} x + \ln x \quad - \lim_{x \rightarrow e} x + \ln x$$