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1. $\lim_{x \to 0} x^2 - x + 1 + \frac{1}{x+1} = 2$

2. $\lim_{x \to 0} (x^2 - x + 1) \cdot \cos(x) = 1$

3. $\lim_{x \to 1} \frac{3x^2 - 1}{1 + 2x} = \frac{3 - 1}{1 + 2} = \frac{2}{3}$

4. $\lim_{x \to 1} (3x^2 - 1)^{\frac{1}{2x}} = (3 - 1)^{\frac{1}{2}} = \sqrt{2}$

5. $\lim_{x \to 2} \frac{2x - 4\cos(x-2)}{x+1} =$

$$\frac{2 \cdot 2 - 4\cos(2-2)}{2+1} = \frac{0}{3} = 0$$

6. $\lim_{x \to 0} (x^2 - x + 1)^{1-\cos(x)} =$

$(0 - 0 + 1)^{1-1} = 1^0 = 1$

7. $\lim_{x \to +\infty} [x^2 + \cos(x)] =$

$+\infty + \cos(+\infty) = +\infty$

8. $\lim_{x \to -\infty} [x^2 + \cos(x)] =$

$(-\infty)^2 + \cos(-\infty) = +\infty$

9.

$$\lim_{x \to 0} \frac{1}{x} \cdot \frac{1}{x+1} = \frac{1}{x^2+x} = \frac{1}{0}$$

$$= \pm\infty \qquad \lim_{x \to 0^-} = -\infty \qquad \lim_{x \to 0^+} = +\infty$$

Asymptota vertikal: $x = 0$

10.

$$\lim_{x \to 1} \frac{x^2-3x+2}{x-1} = \frac{1-3+2}{1-1} = \frac{0}{0}$$

$$\lim_{x \to 1} \frac{x^2-3x+2}{x-1} = \frac{2x-3}{1} = 2-3 = \underline{\underline{-1}}$$

l'Hospital

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$$\lim_{x \to 1^+} \frac{x-1}{\sqrt{x-1}} = \frac{0}{0}$$

$$\lim_{x \to 1} \frac{(x-1)^2}{x-1} = \frac{(x-1)(x-1)}{(x-1)} = x-1$$

$$= 1-1 = 0$$

12 $$\lim_{x \to 1} \frac{\sqrt{x}-1}{x-1} = \frac{0}{0}$$

$$\lim_{x \to 1} \frac{\frac{1}{2\sqrt{x}}}{1} = \frac{1}{2\sqrt{x}} = \frac{1}{2}$$

L'Hôpital

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$$\lim_{x \to 0} \frac{1 - \sqrt{1-x}}{x} = \frac{1 - \sqrt{1-0}}{0} = \frac{0}{0}$$

$$\lim_{x \to 0} \frac{1 - \sqrt{1-x}}{x} = \frac{\frac{1}{2\sqrt{1-x}}}{x} = \frac{1}{2\sqrt{1-x}} =$$

l'Hôpital

$$\frac{1}{2\sqrt{1-0}} = \frac{1}{2}$$

14.

$$\lim_{x \to +\infty} \sqrt{x+2} - \sqrt{x-2} = +\infty - \infty$$

$$\lim_{x \to +\infty} \sqrt{x+2} - \sqrt{x-2} =$$

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

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

$$\frac{4}{\sqrt{+\infty+2}+\sqrt{+\infty-2}} = \frac{4}{+\infty} = 0$$

Asintota horizontal: $y = 0$