5.28.

a) $p_n(x) = \frac{1}{2} - \frac{1}{4}(x-2) + \frac{1}{8}(x-2)^2 + \cdots + \frac{(-1)^n}{2^{n+1}}(x-2)^n$;

b) $p_n(x) = 1 + \frac{1}{2}(x-1) - \frac{1}{2^2 2!}(x-1)^2 + \cdots + (-1)^{n+1}\frac{1\times 3\times 5\times\cdots\times(2n-3)}{2^n n!}(x-1)^3$.

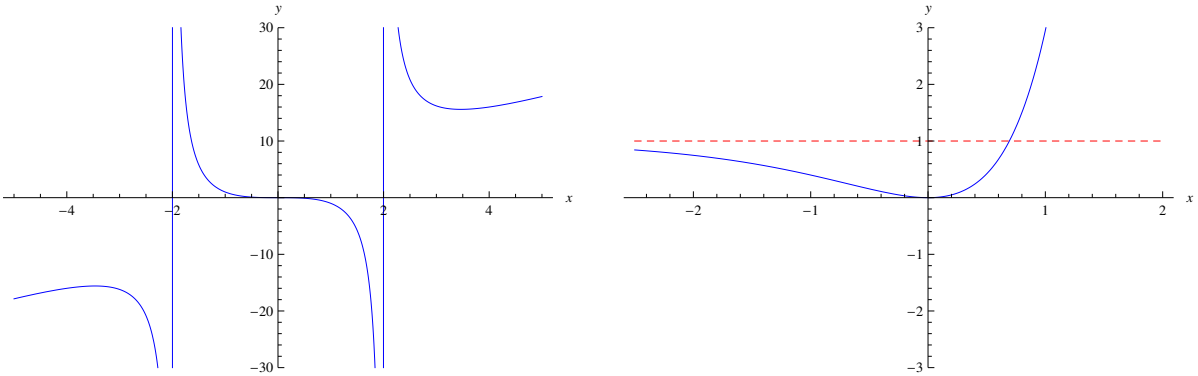
5.29.

a) $x = -2$; *b)* não tem; *c)* $x = 0$, $x = 6$ e $x = 12$; *d)* $x = \frac{1}{e}$.

5.30. $p(x) = -\frac{1}{3}x^2 + \frac{2}{3}x + 1$.

5.31. O quadrado.

5.32. Gráficos das funções:



(a) (b)

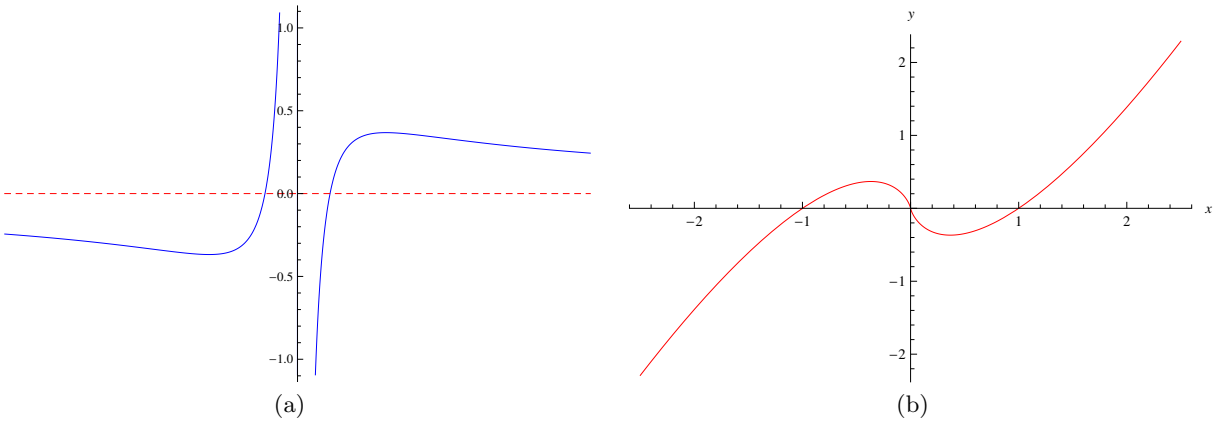
Figure 1: Gráficos das funções (a) $\frac{3x^3}{x^2-4}$, (b) $(e^x-1)^2$.

5.33.

a) Continua em $\mathbb{R}\backslash\{0\}$, $\lim_{x\to-\infty} f(x) = \frac{\pi}{4}$ e $\lim_{x\to+\infty} f(x) = \frac{\pi}{4}$.

b) f é monótona decrescente e tem máximo em $(0, f(0))$.

c) Pontos de inflexão: $\left(-\frac{1}{2}, f\left(-\frac{1}{2}\right)\right)$.



(a) (b)

Figure 2: Gráficos das funções (a) $\dfrac{\ln|x|}{x}$ e (b) $x\ln|x|$.

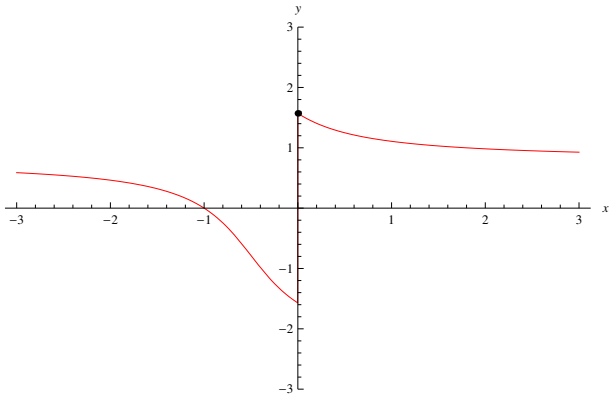


Figure 3: Gráfico da função do exercício 5.33.

5.34.

a) $a = 1$.

b) $\lim\limits_{x\to+\infty} f(x) = 0$ e $\lim\limits_{x\to-\infty} f(x) = -\dfrac{\pi}{2}$.

c) $f'(x) = \begin{cases} e^{-x}(x-1) & \text{se } x \geq 0, \\ \dfrac{1}{1+x^2} & \text{se } x < 0. \end{cases}$

d) f é crescente em $]-\infty, 1[$ e decrescente $]1, +\infty[$, tem máximo local em $(1, f(1))$

5.35. *a*) V; *b*) F; *c*) V.