2.3.

9. polynomial with degree 6

15. \( f(0) = m \cdot 0 + b = 2 \)  \( \Rightarrow b = 2 \)

\( f(3) = m \cdot 3 + b = -1 \)  \( \Rightarrow 3m = -3 \Rightarrow m = -1 \)

51. (a) \( p = -x^2 + 16 \)

\( \begin{array}{c|cccc} x & 0 & 1 & 2 & 3 \\ \hline p & 16 & 15 & 12 & 7 \\ \end{array} \)

(b) \( q = p = -x^2 + 16 \)  \( \Rightarrow x^2 = 9 \)  \( \Rightarrow x = \pm 3 \)

55. (a) \( p(x) = x^2 + 16x + 40 \)

\( \begin{array}{c|cccc} x & 0 & 1 & 2 \\ \hline p & 40 & 57 & 76 \\ \end{array} \)

(b) \( p(2) = 2^2 + 16 \cdot 2 + 40 = 4 + 32 + 40 = 76 \)

2.4 13

\( \begin{array}{c|cccccccc} x & 0.9 & 0.99 & 0.999 & 1.001 & 1.1 & 1.1 \\ \hline f(x) & 100 & 10,000 & 1,000,000 & 1,000,000 & 10,000 & 100 \\ \end{array} \)

the limit does not exist
33. \[
\lim_{x \to 2} \frac{2x+1}{x+4} = \frac{2 \cdot 2+1}{2+4} = \frac{5}{6}
\]

49. \[
\lim_{x \to 1} \frac{x^2-1}{x-1} = \lim_{x \to 1} \frac{(x+1)(x-1)}{x-1} = \lim_{x \to 1} (x+1) = 1+1 = 2
\]

59. \[
\lim_{x \to 1} \frac{\sqrt{x}-1}{x-1} = \lim_{x \to 1} \frac{\sqrt{x}-1}{x-1} \cdot \frac{\sqrt{x}+1}{\sqrt{x}+1} = \lim_{x \to 1} \frac{x-1}{(x-1)(\sqrt{x}+1)} = \lim_{x \to 1} \frac{1}{\sqrt{x}+1} = \frac{1}{1+1} = \frac{1}{2}
\]