24. $\lim_{x\to a} \dfrac{f(x)+g(x)}{2h(x)} = \dfrac{\lim_{x\to a} f(x) + \lim_{x\to a} g(x)}{2\lim_{x\to a} h(x)} = \dfrac{2+4}{2(-1)} = -3$

68. $\lim_{x\to 0} \dfrac{\tan 2x}{3x} = \lim_{x\to 0}\left(\dfrac{\sin 2x}{\cos 2x}\cdot\dfrac{1}{3x}\right) = \left(\lim_{x\to 0}\dfrac{1}{\cos 2x}\right)\left[\lim_{x\to 0}\dfrac{\sin 2x}{\frac{3}{2}(2x)}\right] = 1\cdot\dfrac{2}{3}\cdot\lim_{x\to 0}\dfrac{\sin 2x}{2x} = \dfrac{2}{3}\cdot 1 = \dfrac{2}{3}$

91. Let $g(x) = -x^2$ and $h(x) = x^2$ for all real x. Then $g(x) \le f(x) \le h(x)$ for all x. Since $\lim_{x\to 0} g(x) = \lim_{x\to 0} h(x) = 0$, the result follows from the Squeeze Theorem.

93. Let $f(x) = \dfrac{1}{x}$ and $g(x) = -\dfrac{1}{x}$. Then $\lim_{x\to 0} f(x)$ and $\lim_{x\to 0} g(x)$ both fail to exist. But $\lim_{x\to 0}[f(x)+g(x)] = \lim_{x\to 0}\left(\dfrac{1}{x}-\dfrac{1}{x}\right) = \lim_{x\to 0} 0 = 0$. This example does not contradict the Sum Law of Limits because the law is valid only if both $\lim_{x\to a} f(x)$ and $\lim_{x\to a} g(x)$ exist.

28. Since $\lim_{x\to -2}\dfrac{x^2-4}{x+2} = \lim_{x\to -2}\dfrac{(x-2)(x+2)}{x+2} = \lim_{x\to -2}(x-2) = -4$, we define $f(-2) = k = -4$, that is, take $k = -4$.

29. We require that $f(1) = 4 = \lim_{x\to 1^-}(ax+b) = \lim_{x\to 1^+}(2ax-b)$, or $a+b=4$ and $2a-b=4$. Solving the last two equations simultaneously, we obtain $a = \frac{8}{3}$ and $b = \frac{4}{3}$.

60. $f(x) = x^2 - 4x + 6$ is continuous on $[0,3]$. $f(0) = 6$ and $f(3) = 3$. Since $f(3) \le 3 \le f(0)$, there exists a number c in $[0,3]$ such that $f(c) = 3$. To find c we solve $x^2 - 4x + 6 = 3 \Rightarrow x^2 - 4x + 3 = (x-3)(x-1) = 0$ giving $x = 1$ or 3. Therefore $c = 1$ or 3.

64. $f(x) = x^4 - 2x^3 - 3x^2 + 7$ is continuous on $[1,2]$. $f(1) = 3 > 0$ and $f(2) = -5 < 0$. Therefore, by Theorem 7, $f(x) = 0$ has at least one root in $(1,2)$.