$$W(x) = \frac{PR^2}{(R+x)^2} = PR^2(R+x)^{-2}$$

$x_0 = 0$

$$W'(x) = \frac{\cancel{0(R+x)^2} - PR^2(2)\cancel{(R+x)}}{(R+x)^{\cancel{4}3}} = -2PR^2(R+x)^{-3}(1)$$

$$= \frac{-2PR^2}{(R+x)^3} = W'(x)$$

$$L(x) = W(0) + W'(0)(x-0)$$

$$L(x) = P - \frac{2P}{R}x$$

$$118.8 = 120 - \frac{2(120)}{20{,}900{,}000}x$$

$$-1.2 = -\frac{240}{20{,}900{,}000}x \quad \left(-\frac{20{,}900{,}000}{240}\right)$$

$$\left(-\frac{20{,}900{,}000}{240}\right)$$

$$104{,}500\text{ ft} = x$$

$$W(0) = \frac{PR^2}{\cancel{(R+0)^2}\ R^2}$$

$$W'(0) = \frac{-2PR^2}{\cancel{(R+0)^3}\ R^3}$$

1% of 120

1.2 lb.

118.8 lb.

31

$$e^x = -x \qquad e^x + x = 0$$

$$f(x) = e^x + x$$

$$f'(x) = e^x + 1$$

$$x_0 = -1$$

$$x_1 = -1 - \frac{f(-1)}{f'(-1)} =$$

$$\lim_{x \to a} \frac{f(x)}{g(x)}$$

If $\lim_{x \to a} f(x) = \lim_{x \to a} g(x) = 0 \Rightarrow \frac{0}{0}$

$\hookrightarrow = \pm\infty \Rightarrow \frac{\infty}{\infty}$

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

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

$$\lim_{x\to 1}\frac{x-1}{x^2-2x+1} = \lim_{x\to 1}\frac{\cancel{x-1}^{\,1}}{\cancel{(x-1)}_{\,1}(x-1)} = \lim_{x\to 1}\frac{1}{x-1} = \infty \quad \text{dne}$$

$$\lim_{x\to\infty}\frac{x^2+1}{x^3+5} = \lim_{x\to\infty}\frac{(x^2+1)\left(\frac{1}{x^3}\right)}{(x^3+5)\left(\frac{1}{x^3}\right)} = \lim_{x\to\infty}\frac{\cancel{\frac{1}{x}}^{\,0}+\cancel{\frac{1}{x^3}}^{\,0}}{1+\cancel{\frac{5}{x^3}}_{\,0}} = \frac{0}{1} = 0$$

$$\frac{\frac{x^2}{x^3}+\frac{1}{x^3}}{\frac{x^3}{x^3}+\frac{5}{x^3}}$$

$$\lim_{x\to\infty}\frac{x^3+5}{x^2+1} = \lim_{x\to\infty}\frac{\frac{x^3}{x^2}+\cancel{\frac{5}{x^2}}^{\,0}}{\frac{x^2}{x^2}+\cancel{\frac{1}{x^2}}_{\,0}} = \lim_{x\to\infty}\frac{x}{1} = \infty$$

$$\lim_{x\to\infty}\frac{\boxed{2}x^2+3x-5}{\boxed{1}x^2+4x-11} = \lim_{x\to\infty}\frac{2+\cancel{\frac{3}{x}}-\cancel{\frac{5}{x^2}}}{1+\cancel{\frac{4}{x}}-\cancel{\frac{11}{x^2}}} = \frac{2}{1} = 2$$

$$\lim_{x\to 0}\frac{\sin x}{x} = \frac{0}{0}$$

$$\lim_{x\to a}\frac{f(x)}{g(x)} \quad \text{, if } \lim_{x\to a} f(x) = \lim_{x\to a} g(x) = 0$$

$$L(x) = f(x_0) + f'(x_0)(x-x_0)$$

diff. at $x=c$

cont at $x=c$

$$f(c) = \lim_{x\to c} f(x) = 0$$

$$g(c) = \lim_{x\to c} g(x) = 0$$

$$f(x) = \boxed{f(c)} + f'(c)(x-c) = f'(c)(x-c)$$

$$g(x) = \boxed{g(c)} + g'(c)(x-c) = g'(c)(x-c)$$

$$\lim_{x\to c}\frac{f(x)}{g(x)} = \lim_{x\to c}\frac{f'(c)(x-c)}{g'(c)(x-c)} =$$